

**Environmental Education in Schools: Contrasting Programmes, Context
and Impact in Scotland and Zimbabwe.**

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LIST OF ACRONYMS

ACTION	Not an acronym. Upper case always used to distinguish it from the word 'action'.
AffOResT	Association for Farmers of Organic Research and Training
AREX	Agricultural and Research Extension Services
BESO- USAID	Basic Education System Overhaul (United States Agency for International Development)
BEST	Better Environmental Science Teaching
CAMPFIRE	Communal Areas Management Programme for Indigenous Resources Science Exhibitions
CBOs	Community Based Organisations
CCS	Countryside Commission for Scotland
CDU	Curriculum Development Unit
CE	Conservation Education
CFC	Chloro Fluoro Carbons
CIDA	Canadian International Development Agency
CITES	Convention on International Trade in Endangered Species
CPD	Continuous Professional Development
CSD	UN Commission on Sustainable Development
DEAP	The District Environmental Action Plans
DED	German Development Service
DEO	District Education Officer
DNR	Department of Natural Resources
EBs	Environmental Bodies
EE	Environmental Education
EEASA	Environmental Education Association of Southern Africa
EfS	Education for Sustainability
EIA	Environmental Impact Assessment
ELF	Environmental Liaison Forum
ELMS	Environment and Land Management Sector
ENGOS	Environmental Non-Governmental Organisations
EOs	Education Officers
ES	Environmental Studies
ESD	Education for Sustainable Development
ESE	Environmental and Sustainability Education
EU	European Union
EVE	Environmental Values Education
FEE	Foundation for Environmental Education
FREE	Fort Rixon Environmental Education Programme
GfL	Grounds for Learning
GRAB	Group for Recycling in Argyll and Bute
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
HEAL	Hurungwe Environmental Education Programme

HMIE	Her Majesty's Inspectorate of Education
IEEP	International Environmental Education Programme
ILUD	Integrated Land Use Design
INSET	Inservice Training
IT	Information Technology
IUCN	World Conservation Union
KEEP	Kwekwe Environmental Education Programme
LA	Local Authority
LEA	Local Education Authority
LEEP	Low Veld Environmental Education Programme
LGDA	Lower Gwelo Development Association
LTCS	Land Fill Tax Credit Scheme
LTL	Learning Through Landscapes
MoESC	Ministry of Education, Sports and Culture
NCCS	Nature Conservancy Council for Scotland
NDPBs	Non-Departmental Public Bodies
NETCAB	Regional Networking and Capacity Building Programme
NFN	Natural Farming Network
NGOs	Non-governmental Organisations
NLCB	National Lottery Charities Board
NNRs	National Nature Reserves
NPE4	National Priority 4 for Education in Scotland
NPE2	National Priority 2 for Education in Scotland
NS	Nature Study
NSA	National Scenic Areas
OE	Outdoor Education
PAAP	Poverty Alleviation Action Plan
PACE	Participatory Agricultural Curriculum for the Environment
PEAK	Kariba Environmental Education Programme
PED	Provincial Education Director
PELUM	Participatory Ecological Land Use Management
POEMS	Policies on Environmental Management in schools
PTA	Parents and Teachers Association
RAP	Recycling and Anti-litter Programmes
REEP	Renfrewshire Council Primary 5 'Environmental Education Programme'
RSPB	Royal Society for the Protection of Birds
SAC	Scottish Arts Council
SACs	Special Areas of Conservation
SADC	Southern African Development Community
SCCC	Scottish Consultative Council on the Curriculum
SCOPE	Schools and Colleges Permaculture
SDE	Sustainable Development Education
SEEC	Scottish Environmental Education Council
SEED	Scottish Executive Education Department
SEPA	Scottish Environmental Protection Agency

SIDA	Swedish International Development Agency
SMT	School Management Team
SNH	Scottish Natural Heritage
SPAs	Special Protection Areas
SSSIs	Sites of Special Scientific Interest
SSSP	Sustainable Secondary Schools Partnership
ST ² EET)	Secondary Teacher Training Environmental Education Programme
SWCL	Scottish Wildlife and Countryside Link
TGTC	Tree Growing and Tree Care
TIC	Teacher in Charge
UK	United Kingdom
UN	United Nations
UNCED	United Nations Conference on Environment and Development
UNED	Universidad Nacional de Educación a Distancia
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational Scientific and Cultural Organisation
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VOs	Voluntary Organisations
WEZ	Wildlife Environment Zimbabwe
WWF	World Wide Fund for Nature
ZIMTRUST	Zimbabwe Trust
ZIP	Zimbabwe Institute of Permaculture
ZWEECF	Zimbabwe Environmental Education Consultative Forum

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ABSTRACT

This study investigates environmental education (EE) against a background of growing concern about the importance of environmental issues and international consensus on the need to develop an environmentally responsible global citizenry. The focus was on individual EE programmes in the context of the formal school curriculum in Zimbabwe and Scotland with special emphasis on the impact of each programme and the macro- and micro-context within which these impacts are determined. The results of a national survey in each country are the basis of the non-random sampling of one Secondary and three Primary case-study schools that were considered examples of 'good practice'.

Data collection techniques included interviews with school staff and other stakeholders, observations, and programme document analysis. Programme theory guided the way cases were investigated and described. A qualitative research approach led to claims of socially constructed knowledge regarding the nature of good practice in EE in the two countries, contextual factors that shape the impact of EE, and what contrasting the two countries reveals about the factors that aid and constrain the development of environmental citizenship behaviour in the school context.

Claimed outputs of EE programmes are divided into four categories: personal development, environmental citizenship, social and community development, and school development. The socio-economic context, the position of EE in the overall curriculum, the nature of issues investigated, and the resource-base shaped the impact of EE programmes. The nature of the issues investigated, the role of learners in the development and maintenance of school ground developments, the role of these school ground developments, and the role of the school in the community all affected the claimed development of environmental citizenship behaviour. In Zimbabwe pupil participation was pragmatic, focussing on pupils as current and future custodians of natural resources. In the Scottish context pupil participation appeared idealistic and lacking an action context; rather the emphasis was on preparing pupils for future personal environmental decision-making. In Zimbabwe severe socio-economic problems have forced responsibilities upon children. Here environmental education programme design has acknowledged this by providing a real and relevant contemporary context that has pressing current social relevance.

Declaration

I hereby declare that this submission is my own work and to the best of my knowledge it contains no material previously published or written by another person, nor material which to a substantial extent has been accepted for the award of any other degree or diploma at University of Edinburgh or any other educational institution, except where due acknowledgement is made in the thesis. Any contribution made to the research by others, with whom I have worked at University of Edinburgh or elsewhere, is explicitly acknowledged in the thesis.

I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that assistance from others in the project's design and conception or in style, presentation and linguistic expression is acknowledged.

Signed:..



.....

Date: March 22, 2006

1 INTRODUCTION

The context of the problem

It became obvious in the 20th Century that mankind is having an increasing effect on the planet's ecosystems and biogeochemical cycles to the extent of causing environmental change (Harris, 2004, p. 3). Environmental change is a constant feature of the evolution of the Earth. Some changes are periodic and for example climate exhibits 'interannual, multidecadal, and millennial variations' (Hulme, 2004, p. 21 cited in Harris, 2004, p. 266) which result in environmental changes. There is a general agreement however that environmental change is now occurring at an unprecedented rate, and anthropogenic influences are deemed to be the cause. This is in part because man, for the first time ever, now has the power to change the environment on a global scale (Parks, 1997, p. 8). The global impact of environmental problems has resulted in scientists and politicians calling for cooperation and sustainable use of common environmental resources.

Despite the evidence of environmental problems such as loss of biodiversity, land cover change, records of climatic change and many manifestations of pollutions, man (*sic*) continues to pursue activities that perpetuate these problems. The complexity of environmental problems, the range of actors who are stakeholders in the issues, uncertainty about the environmental science underpinning the issues, the different ways in which environmental problems affect different parts of the Earth, the different perception of the problems by different social and cultural groups, and the costs associated with changing practices and remediation all make the environmental issue difficult to resolve (Harris, 2004, p. 265).

Whether we are from a 'developed' or 'developing' country, our livelihoods are ultimately natural resources dependent. In most countries natural resources are also the key to economic growth, this is especially true for developing countries (Harris, 2004, p. 269). It is therefore important to conserve our environment, both for its own sake and the

sake of our livelihoods. Concern about the global impact of environmental problems worldwide has led to the largest ever assemblies of Heads of States and Government. Among the remedies proposed at these assemblies are calls for education (Smyth, 1998, p. 1). Ever since the 1972 United Nations Conference on the Human Environment that took place in Stockholm, there have been calls for the realignment of education to address the environmental crisis (Sterling, 2001, p. 12). The Stockholm conference sowed the seeds for The United Nations Conference on the Environment and Development (UNCED)– widely referred to as The Earth’s Summit – which took place in Rio de Janeiro, Brazil, in June 1992. This established the tone and direction of the international agenda for the foreseeable future. One of the five outcomes of The Earth’s Summit was ‘Agenda 21’. This is a national and international ‘blueprint for action’ on the environment and development agenda for the 21st Century (Parks, 1997, p. 14). Chapter 36 of Agenda 21 states that education is critical for promoting sustainable development, and citizens must take a participatory role in environmental protection (UNCED, 1992, Chapter 36).

As according to Bradley, Waliczek and Zajicek (1999) the basis of many environmental problems is ‘irresponsible’ environmental behaviour, the ultimate goal of environmental education (EE) is the development of environmentally responsible citizens (Hungerford & Peyton, 1976; Roth, 1970 cited by Hines, Hungerford & Tomera, 1986). It is generally recognised that to achieve this outcome, environmental educators must provide students with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment (United Nations Educational Scientific and Cultural Organisation [UNESCO], 1977).

The purpose of the study

The environment has always fascinated me. Its visual beauty in its different manifestations is a humbling spectacle. The perfection of nature’s adaptation for purpose at all levels of biological organisation was revealed by the study of the sciences during years of schooling. Even after I was taught the theory of evolution in high school

Biology despite the evidence for it, I still preferred the Biblical version of events – of an awesome, highly intelligent and loving creator behind creation, so perfect was the organisation, so amazingly organised, from the solar system in the cosmos to the smallest single-celled organism. After a while I became quite struck by the incredible fragility of nature under the exercise of man's seemingly infinite capacity to affect it. This led me to a fascination with how man (*sic*) could be educated to appreciate nature and the environment, and to protect it for its own sake first, and for his own sake too, for *Homo sapiens* is only one of millions of organisms that share this unique planet. This led me to undertake EE courses such as the Rhodes Certificate in Environmental Education in 2000, join the membership of environmental organisations such as the Environmental Liason Forum (ELF) as well as undertake empirical research into EE in the formal school curriculum in Zimbabwe (Namasasu & Kandemiri, 2002).

Having gone through the Zimbabwean education system from primary through to post-graduate study I worked as a teacher for a couple of years. After my Masters degree I worked as a teacher trainer at the University of Zimbabwe's Faculty of Education for three years, before embarking on this PhD study. My interest in the subject over those years resulted in an accumulation of considerable knowledge about EE in Zimbabwe. I was firmly of the view that the primary school was for several reasons the favoured place for EE coverage. The subjects of Environmental Science and Social Studies in the primary school lend themselves well to the coverage of EE. According to Stevenson (1987) the goals, principles and guidelines of environmental education suggest a particular orientation of curriculum and pedagogical practices in which students engage individually or in groups in problem-solving, action-based activities. Such a focus on real environmental issues calls for interdisciplinary and flexible enquiry. This is often in contrast with school curricula, especially those at secondary level which tend to be discipline-based and emphasises abstract theoretical problems. In the secondary schools of Zimbabwe this discipline-based curriculum has meant that although environmental messages were taught in subjects such as Agriculture, Geography, Biology and Science, only those pupils who studied those subjects were exposed to these issues. Other

secondary school factors that challenge coherent delivery of EE at this level are discussed here in A Review of Literature (Chapter 2). In further and higher education in Zimbabwe there are a number of courses that have a significant and even particular EE content, but the percentage of the overall population exposed to these courses is quite small. This is why it has always been my belief that maximum advantage must be taken of the primary school curriculum to deliver successful EE. There however remains a need for the lessons learnt in primary school to be consolidated at secondary level and within the communities where these learners come from. If learners do not see lessons taught at school practiced in the community, or indeed within the same school, outside the classroom, then important lessons may be relegated to 'classroom knowledge', and of no practical use and application out of the classroom. This has been called 'boxing' of information (Titman, 1994). I was aware too that some environmental organisations targeted primary schools with environmental programmes in a way that was more unusual for secondary schools in the country.

When I came to study at the University of Edinburgh I was keen to broaden my horizons by studying practice in Scotland and contrasting it with that in Zimbabwe to see what could be learnt about good practice in EE. Was good practice generic or was it context bound? This led to an interest in how contextual factors affected the type of EE programmes and the desired outcomes from these programmes. In Scotland the curriculum is written on a continuum from the ages of 5 to 14 and so I decided here too to study EE in the formal school curriculum with a focus on primary and lower secondary schools as appropriate.

Thus, based on an enduring personal interest in environmental education, this research became delineated as a study of environmental education (EE) in the formal school curriculum of two countries, Scotland and Zimbabwe. Previous portraits of EE in Scotland (Smyth, 1999) and Zimbabwe (Taylor, 1998) study broad trends and status of the subject and do not look in detail at how policy translates to practice 'on the ground'.

The implementation of EE in schools, with a special emphasis on primary schools and lower secondary level of formal education, is the emphasis of this research.

Young people are a target of most EE initiatives in both the formal and non-formal sectors of education, not least because of their obligatory attendance during years of schooling, and their potential future role as environmental decision-makers. Yet given the important role that education has been given in the pursuit of a solution to the world's environmental problems there is a surprising dearth of information about the kinds of factors that determine the effectiveness of EE in regular mainstream educational provision at this level. Hence the present study considers the projected and actual outcomes of EE programmes in conventional school curricula and the factors that mitigate their impact.

The different political economies of different groupings of countries within the world-economy give rise to different types of environmental problems. Environmental education efforts are faced with different environmental, cultural, economic, political and educational realities, depending on the context of their implementation. Indeed the context is an important element in understanding the nature and goals of the curriculum in any given field (Fien, 1992). A complicating factor that emphasises the importance of detailed study at 'grassroots' level, is the gap that often exists between national education policy and practice in the classroom (Ho, 1998; Sauvé, 1999). Thus the study of policy provision for EE in a country is not a valid shortcut to the reality of practice on the ground.

Despite its political and economic problems Zimbabwe retains the record of being one of the countries in Africa with the highest enrolment of age-eligible learners in primary and secondary schools. For 2004 a Populstat website (Lahmeyer, 2004), confirmed by United Nations Children's Fund (UNICEF) figures, cites the enrolment of 100% age eligible children into primary school and a 52% enrolment of age eligible children into secondary school. Scotland on the other hand has a policy of compulsory 5-16

education. Thus, although in some parts of the world the scope of formal education as a medium of mass 'broadcast' of EE is limited by low school enrolment figures this does not apply to the two case study countries used in this research. Scotland, a 'first world' country, historically a pioneer in the EE movement, and Zimbabwe, a developing country and my homeland, are used to study the effect of context on the effectiveness and impact of EE interventions. This research also assesses the effectiveness of individual programmes by mapping out the degree to which they develop environmental citizenship behaviour. The Hungerford and Volk (1990) model of variables involved in environmental citizenship behaviour will be the basis of this mapping exercise. This thesis takes the reader through the discovery and learning process that I went through as a researcher, and I believe it will be useful for educating stakeholders in both countries on 'good practice' in this sector, and at this level.

Methodology and scope of the study

A preliminary case study of the Renfrewshire Council Primary 5 'Environmental Education Programme' (REEP) was used to learn more about the nature of EE in Scotland's schools and the possibility of using programme theory (Rossi et al., 1999) as an analytical tool. Using the lessons learnt during the preliminary case study, this qualitative research uses nested case study as a strategy to study EE in Scotland and Zimbabwe.

Case studies of individual schools within each country are preceded by a qualitative national survey based on themes determined during a preliminary fieldwork exercise carried out in Scotland and extrapolated to Zimbabwe. Four schools were the subject of in-depth case study, two primary schools in Zimbabwe, and one primary and one secondary school in Scotland. These represent perceived examples of 'good practice' in their respective countries. They were selected using 'intensity sampling' (Patton, 2002, p. 234) during a national survey of EE in each country. Data collection during the national surveys included postal questionnaires followed by face-to-face interviews. During case studies data collection involved interviews with school headteachers,

teachers and representatives of partner organisations; observations and document analysis. Programme theory was used as a lens that provided a predetermined framework for data collection and analysis within the cases. Triangulation of data sources and member checking (Creswell, 2003, p. 196) or iteration (Smith, 1989, p. 75; Rossi et al, 2004, p. 152) was used to validate programme theories. The impact theories of all EE programmes are used to draw out major themes regarding their real and projected impacts. These themes are the basis for contrasting EE practice in the two countries and lessons that can be learnt from them. Finally, propositional generalisations regarding the impact of EE and the contextual influences that mitigate this impact are made.

Structure of the thesis

Chapter 2 describes the historical development of EE, from a focus on natural environments and problems to a gradual balancing with concerns associated with economic development, social and political equity, human oppression and cultural diversity and how this led to the emergence of Education for Sustainable Development (ESD) (see p.18). Although it has had some success, there is a general agreement in the field that EE has been largely ineffective in attaining its goals (Sauvé, 1999; Sterling, 2001; Gruenewald, 2004). The blame for this is largely placed on the inadequacy of the context of its implementation. Contrary to some authors in the field who propose that EE and ESD should remain discrete and complementary, I argue that the complexity inherent in the two concepts, and the perception of an overloaded curriculum, means that it is unlikely that practitioners in primary and secondary education would be able to hold delineated conceptions of EE and ESD that persist in differentiated practices. The chapter also presents background and literature justification for the research questions that are the basis of this study.

The Methodology and Research Design is explained in Chapter 3. The chapter is divided into two parts. Part 1 presents, in full, the preliminary case study of the REEP. This case study brought to light the complexity of overall EE provision in Scotland's schools, leading to the conclusion that EE is best studied *in situ* by case studies of selected

schools. The use of programme theory as an analytic tool within these case studies required that case studies be *nested*, with individual EE programmes within selected schools being themselves *cases* and the ultimate unit of analysis. Part 2 outlines the characteristics of qualitative research that make it distinctive from other research methodologies. The collective case study is the qualitative strategy that was used in this research. This is because of the advantage of case study when 'how' and 'why' questions are being asked about a contemporary set of events over which the researcher has little or no control. Case study is also ideal for tackling exploratory 'what' questions that are the focus of the study into the nature of EE in the two countries.

Chapter 4 describes the national context of EE in Scotland. The publication *Learning for Life: a National Strategy for Environmental Education in Scotland* (Scottish Office, 1993) has been the foundation on which many sectors in Scotland have based their own EE policies. This document makes it clear that partnerships between stakeholders are a key element of the national EE implementation strategy. Consequently Scottish Central Government, Local Authorities, schools and voluntary organisations come together in complex partnerships in pursuit of EE throughout the country. The present research found that various environmental education programmes running within schools are generally based in the school curriculum and are guided by a strong belief in the importance of enjoyable outdoor experiences for the education of future decision-makers.

Chapter 5 presents the two Scottish case studies. 'Case study one' is Inveraray Primary School. A lot of EE taking place at this school is in partnership with the 'Scottish Natural Heritage' and 'Grounds for Learning', while the headteacher's enthusiasm is a key factor in the success the school enjoys. In this area and according to Hungerford and Volk's (1990) Model environmental education at this school develops predominantly *Entry-level* predictors of environmental citizenship behaviour and some *Ownership* variables. Active involvement of pupils in school ground development accompanies the school's attempt to teach the whole curriculum in the outdoors. As well as some

cognitive benefits pupils learn respect and care for the living things and the environment, while opportunities arise for interclass cooperation.

‘Case study two’ is Currie Community High School (Currie High). Here the research lens shifts to the first and second years of secondary school but still within the 5-14 ‘curriculum guidelines’. The drivers of EE include a school policy of habitat replacement that has its roots in concern for future generations. Replaced habitat areas are used as a teaching resource including the teaching of EE. Environmental education activities aim to get students in touch with the living world, widening their scope and increasing interest and respect for the living world. Teaching activities develop predominantly *Entry-level* and *Ownership* predictors of environmental citizenship behaviour. As a community school Currie High has a community outreach programme that, while making use of school ground sites, does not involve students. The ESD programme developed for pupils in these first two years of secondary school, Secondary 1 (S1) and Secondary 2 (S2), is also used to capture the development of ‘*Core Skills*’ required by set National Targets.

The national context of EE in Zimbabwe is described in Chapter 6. Zimbabwe’s new Environmental Education Policy and Strategies, signed into law in June 2004, serves not only to further legitimise a lot of activities that were already taking place in the country in the various sectors, but also chart a way forward. Despite the collaborative efforts by partnerships created in pursuit of EE around the country, the resource base for EE provision in schools remains extremely poor. The size of the country relative to the level of support available for partnerships means that most EE initiatives cover only selected areas of the country. Programmes work as part of national policy implementation, to educate for awareness raising, responsible citizenship and conservation. As the government has committed no extra funding for the implementation of EE in Zimbabwean schools, resources for EE in schools come through partnerships with voluntary organisations whose funding is from overseas donor organisations, while local partners provide support in kind.

Chapter 7 presents the two Zimbabwean case study schools. Mahuwe Primary School is 'case study three' and St Margaret's Primary School is 'case study four'. In these schools EE programmes are based on the value of pragmatic pupil participation as current and future custodians of natural environment and the school is a satellite of new and relevant knowledge for the surrounding community. Programmes develop *Entry-level*, *Ownership* and *Empowerment* variables that are predictors in environmental citizenship behaviour, with St Margaret's, to a greater extent than Mahuwe, taking staff and pupils through practicing environmental citizenship. While modelling good environmental practices, schools give ideas for income generating projects for uptake by members of the school and wider community. Personal benefits to learners include cognitive/academic, affective, health, and vocational benefits. There are also social, community and school benefits accruing from EE activities.

Chapter 8 contrasts the impact of EE programmes in Zimbabwe and Scotland. While in both countries academic improvement is an imperative for schools' participation in EE programmes, socio-economic imperatives, key to Zimbabwean schools' participation, are wholly lacking in the Scottish context. Student participation in EE activities in Scotland is idealistic, with an emphasis on future decision-making. In Zimbabwe learners' participation in EE activities is pragmatic, with an emphasis on learners as current as well as future custodians of natural resources. Environmental activities in Scotland develop predominantly *Entry-level* and *Ownership level* predictors of environmental citizenship behaviour. Environmental activities in Zimbabwe develop these as well as *Empowerment* variables involved in environmental citizenship behaviour, according to the Hungerford and Volk (1990) model. They also go some way towards taking pupils and staff through practicing environmental citizenship. Environmental education activities in the two Scottish schools aim at several affective outcomes, while in the Zimbabwean case EE activities aim to provide affective, health and vocational benefits for learners.

Chapter 9 summarises the thesis and draws out the conclusions of this research. I argue that the primary contextualising influence for EE is the place of two countries within the world economy. This impacts on the values that guide EE programmes and the activities used as a vehicle for these values. In the presence of an adequate resource base, it is schools whose holistic approach to EE provides an interconnected programme of activities with a strong action context that excel. Despite the rhetoric, EE remains marginalised in the mainstream school curriculum of both countries and the evidence is that individual enthusiastic and dedicated teachers are key in rescuing it from possible oblivion. The nature of the issues investigated, the role of learners in the development and maintenance of school ground developments, the role of these school ground developments, and the role of the school in the community all affect the development of environmental citizenship behaviour.

2 A REVIEW OF LITERATURE

For a long time I have been interested in issues of public concern such as corruption in the public sector and environmental degradation. What has always struck me is the power of individuals to impact whole systems. I have also realised that there are sometimes contextual, external, social, economic and political factors that act to constrain the individual's capacity to act in line with values they may hold. The individual is undoubtedly the functional unit in the quest for sustainability at local, national and global levels. The active participation of the general public is a key factor in preventing and solving the environmental problems of contemporary society. Such active participation must be guided by appropriate education.

For a developing country such as Zimbabwe where there is a 'bottlenecking' of the population further up the academic ladder, it seems only logical to maximally utilise the lower stages (primary and lower secondary) for education regarding the environment and related issues of sustainability. Primary education often enjoys a common national curriculum. This means that planned, coherent curricular input at this level is guaranteed an obligatory audience that represents a significant proportion of the population of present and future decision-makers. During and after they leave school learners in developing countries are involved in activities that impact the environment.

I have done some empirical research in this area in the past and I have surveyed a wide variety of literature on the subject, studying some in depth (Namasasu & Kandemiri, 2002). This background led to my decision to study environmental education in the formal school curriculum with a focus on the lower stages of primary and lower secondary schools as appropriate. The review of literature presented below is closely related to important guiding issues related to this research. I will begin with discussion of definitional issues. The two most frequently encountered terms for education regarding the environment and related issues of sustainability during the course of this

study are Environmental Education (EE) and Education for Sustainable Development (ESD).

In line with the exhortation by the Committee of Ministers of the Council of Europe in 1988, when it approved several recommendations aimed at fostering EE among European Union (EU) members, it is important to take note of the basic principles for the promotion of EE from the various conferences that shaped the methodology when reviewing or creating new EE policies. This I believe is a challenge that takes cognisance of the original intentions of EE and ESD when approaching the study of their implementation.

The International for Conserving Nature (IUCN) in 1970 defined EE as follows:

Environmental education is the process of recognising values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the inter-relatedness among man, his culture and his biophysical surroundings. Environmental education also entails practice in decision making and self-formulation of a code of behaviour about issues concerning environmental quality.

(cited in The Scottish Office, 1993, p. 5)

The United Nations Conference on the Human Environment (Stockholm, 1972) created the United Nations Educational Scientific and Cultural Organisation /United Nations Environment Programme (UNESCO/UNEP) International Environmental Education Programme (IIEP) to develop, promote and fund EE. It collaboratively developed the foundations of EE over six years. These appeared in the Belgrade Charter and were ratified as the Tbilisi Declaration (McKeown & Hopkins, 2003). Environmental education was born within modernity as a reaction to the impact of 'progress' and its initial focus initially was to attempt to resolve and prevent the problems caused by the impact of human activities on biophysical systems (Sauvé, 1999).

Several authors (including Sauvé, 1999; McKeown & Hopkins, 2003; Lavery & Smyth, 2003) detail the development of EE. In the 1970s EE offered a new framework for

conservation education. In the 1980s it gradually entered the post-modern era to address the plight of the people. The 1990s saw a continuing focus on the human aspect while EE took a step backwards in the official international discourse, (almost) reduced to a tool for sustainable development. According to Gruenewald (2004) the period between 1970 and the present has witnessed a gradual balancing of traditional environmental concerns with concerns associated with economic development, social and political equity, human oppression, and cultural diversity. Table 2.1 below outlines developments of environmental and sustainable development education alongside major significant international events. Table 2.1 is adapted from Lavery and Smyth (2003).

Table 2.1 Chronology of Events in Environmental Education and Education for Sustainable Development

(adapted from Lavery & Smyth, 2003)

World Events	Notes
Stage 1 Growing concern about damage to the natural environment and need to better public awareness. 1968/69 – Early papers describing EE. 1970 IUCN – Nevada Conference definition of EE.	Humankind and environment treated as separate systems Focus on natural environment and problems
Stage 2 1972 – Stockholm Conference 1975 – Belgrade Charter 1977 – Tbilisi Declaration	Attempts to include humankind and its affairs within the system to be conserved, but EE continued to retain a green image
Stage 3 1980 – IUCN et al. <i>World Conservation Strategy</i> 1987 – Brundtland Report – UNESCO-UNEP Conference international strategy for EE (Moscow) 1991 – IUCN et al. – <i>Caring for the earth</i>	A realistic and proactive model on which to build both environmental and educational policy, incorporating human life and activity in the system Sustainable development appears as the main objective of policy, eagerly adopted by those who felt a green image to be inappropriate
Stage 4 1992 UNCED, Rio de Janeiro: Agenda 21 – Eco-Ed Conference Toronto 1993 – UN CSD set up to monitor progress 1994/96 – A series of UN conferences reaffirm needs for education	Attempt to keep together human and non-human components of the biosphere and their promoters in a single strategy Sustainable Development adopted as international policy National strategies for EE/SDE called for in all countries
Stage 5 1997 UN General Assembly Special Session, reviewing progress – UNESCO Conference, Thessaloniki 2000 – Galicia Expert Meeting	Responsibility for education seemingly now passed on by UN CSD for implementation Action continues to depend on enthusiasts, alone or together Continuing confusion over titles, and the real intentions of promoters

From a phenomenographic study of discourses and practices in EE, Sauvé (1996) identified six conceptions of the environment. These are environment as *nature*, environment as a *resource*, environment as a *problem*, environment as a “*place to live*”, environment as the *biosphere* and environment as a *community project*. The influence of these different conceptions is evident in the pedagogical approaches and strategies

suggested by different authors or adopted by educators to meet the goal of EE which the Belgrade Charter states as:

To develop a world population that is aware of, and concerned about, the environment and its associated problems, and which has the knowledge, skills, attitudes, motivations and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones.

(UNESCO-UNEP, 1976)

Sauvé (1999) argues that from modernist perspectives, searching for unity and universal value, the multiplicity of these conceptions and practices is problematic. However from post-modern perspectives, which emphasise diversity and contextual relevance, these multiple conceptions can be seen as different and possibly complementary approaches to a complicated subject. Sauvé therefore sees the real problem as the often-wide gap between discourse and practice, which, according to him, leads to confusion and loss of effectiveness. Gruenewald (2004) agrees. He states that there is an incredible diversity of EE programmes and activities, both in and outside schools, many of which, especially as they are constituted within the general education curriculum, do not connect with the larger purposes of EE articulated at international conferences. Some are even inconsistent with these larger purposes.

Despite the fact that numerous international statements and mandates have pointed to the key role of education as a change agent towards sustainability, there is a general consensus in the field that EE implementation has been unsatisfactory and relatively lacking in impact over the last decades. At the UNESCO international EE conference in 1997 held in Thessaloniki, UNESCO's general director commented, "Who would deny that too little has been achieved?" A 1997 report to the Commission on Sustainable Development indicated that the major work was still to be done (Sterling, 2001 citing UNESCO Secretary General, 2000). Several reasons for this ineffectiveness have been identified. Sauvé (1999) identifies as problematic the lack of boundaries that define the specific educational niche of EE, and the reactive role in problem solving that was given to it in the Tbilisi Declaration (UNESCO, 1978). While with this role EE has grown into a worldwide movement, becoming broad in scope and extensive in practice, it has also

become fragmented (Sterling, 2001), its implementation characterised by inadequate resources and conditions (Sauvé, 1999). Gruenewald (2004) dwells more on the inadequacy of the 'conditions' of EE implementation that have contributed to its ineffectiveness.

Gruenewald (2004) agrees with the view that EE has been ineffective in its goal to create an environmentally and ecologically literate citizenry, a situation he argues, will persist as long as it continues to discipline itself within the norms of general education. While advocating a continuing discussion over the definition, purposes, and practices of EE, as well as its overall effectiveness, he argues strongly against its co-option by the discourse of general education, to which, he believes, EE is fundamentally opposed. He suggests that EE be abolished because its institutionalisation has muted its potential as a transformative educational discourse practice. Citing Foucault (1977) he uses a Foucauldian lens as an analytical device on issues of power, knowledge and discourse. He then contends that through professional self-regulation, what Foucault calls "the means of correct training", EE adopts disciplinary practices that help reproduce the kind of training that has led us toward social and ecological problems. Its marginal relationship to mainstream educational practice ensures that while strengthening this dominant discourse it is subjugated, neglected, and disciplined in ways that dilute its political content. The mainstream discourse strengthened *sustains unsustainability* through uncritically reproducing norms, fragmenting understanding, sieving winners and losers, recognising only a narrow part of the spectrum of human ability and need, aggravating an inability to explore alternatives, rewarding dependency and conformity, and thereby servicing the consumerist machine (Sterling, 2001). The ineffectiveness of EE is made all the more glaring when examined in light of the social, environmental and educational challenges at issue (Sauvé, 1999; McKeown & Hopkins, 2003). Sauvé (1999) however exhorts opponents, who may be tempted to deny the very relevance of EE, not to 'throw away the baby with the bathwater', but rather than discrediting EE, should acknowledge the obstacles posed by the social and educational context in which it has attempted to implement itself.

Gigliotti (1990) states that there have been many outcomes considered to be successful products of EE. These include the development of a broad-based support for the environmental movement that has resulted in unprecedented public awareness of the threats to our environment. Industry and businesses are now, more than ever before, conscious of their image with regard to environmental issues. What it has failed to do, according to Gigliotti's hypothesis, is to make significant progress in producing citizens willing to make personal sacrifices.

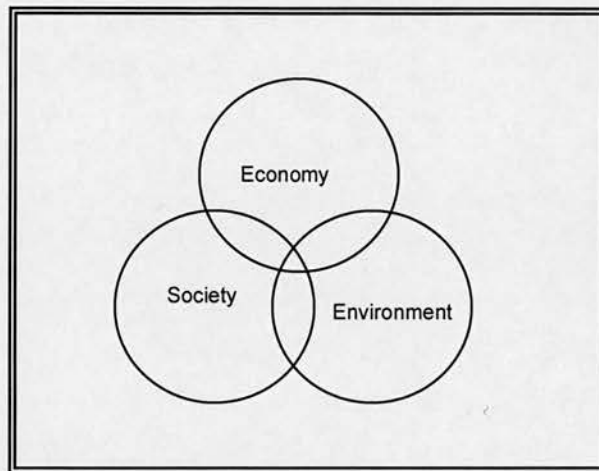
As mentioned earlier, the 1990s brought recognition of the parallels between EE and other movements concerned with education for relevance and social change. These include peace education, development education, world studies, anti-racist education and human rights. This led to the emergence of Education for Sustainable Development (ESD) (Sterling, 2001, p. 30). Perhaps the most commonly cited definition of sustainable development is that of World Commission on Environment and Development (WCED) (1987) which states that:

Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
(World Commission on Environment and Development, 1987)

The concept of sustainable development stresses the close links between the economy and the environment with emphasis on the environment as a constraint that must be taken into account in order to maintain the trajectory of development (Sauvé, 1999). In the 20 years between the 1972 Stockholm Conference and the 1992 Rio conference the goal shifted from environmental protection and pollution reduction to finding a realistic and balanced approach to environmental protection while alleviating human suffering and the ravages that accompany poverty. Sustainability, and therefore ESD in Agenda 21 involves and addresses environment, society, and economy in a locally relevant and culturally appropriate way (McKeown & Hopkins, 2003).

However ESD has been criticised by academics and environmentalists for its political malleability. Like EE, ESD is a product of modernity, emerging as it did as a reaction to the “progress” of western civilisation caused by the exhaustion of resources and the destabilisation of natural balances of power (Sauvé, 1999). The concept of sustainable development emerged from a compromise historically negotiated among various social partners on the WCED (1987). Its vagueness in terms of the actual type of development involved, as long as it was sustainable, is what made the concept acceptable to politicians and economists around the table. Sauvé contends however that adoption of the shrewd slogan “sustainable development” is a fruitful strategy that has seen the environmental aspects of projects recognised as an obligatory concern in economic development. While this may be the case, her stand is that it cannot be proposed, much less imposed, as a goal in education. The expression “development” implies the idea of a trajectory, while the expression “sustainable development” does not indicate the direction or object of this trajectory. Discourse analysis shows that it means primarily “economic development”, making the expression “sustainable development” an oxymoron (Disinger, 1990). One could argue, however, that while a trajectory is implied, it is moderated by the qualifying expression ‘sustainable’. Ironically it is argued that it is precisely this conceptual vagueness that gives the sustainable development strategy its strength (or weakness) (Sauvé, 1999). McKeown and Hopkins (2003) view educating *about* sustainable development as a small but integral part of ESD. They identify educating *for* sustainable development as using education as a tool to achieve sustainability, arguing that after all ESD was born as a tool to achieve sustainability. Sauvé (1999) however, while accepting that it is important to educate *about* sustainable development, as it is a phenomenon of contemporary society, argues that it is unacceptable to educate *for* it because it presents the economic sphere as a supra-entity that governs the relationship between society and the environment, and it is in this economic sphere that development takes place.

Figure 2.1 The Conceptual Structure of Sustainable Development
(Sauvé, 1999)



Sauvé further cites ethical problems with education *for* sustainable development inherent in the fact that sustainable development proposes the sustainability of progress as the ultimate “goal of humanity”. Sustainability in this case becomes the supreme value on which all other values must converge. Its relationship with the environment becomes subordinate to economic development - the only issue being not to exceed its carrying capacity. Sterling (2001) takes issue with the idea from different perspective, proposing that any ‘education *for something*’, however worthy, tends to become both accommodated and marginalised by the mainstream. He states that while ESD has won a small niche in education in recent years, the overall educational paradigm remains unchanged, and within this paradigm most mainstream education *sustains unsustainability* (p.14).

Batchily Ba (1997) of West Africa, cited by Sauvé (1999), regrets that the appearance of new names harms efforts to legitimise and stabilise environmental education, efforts which have proved too costly for the international community and for poor countries. Despite these not uncommon sentiments, McKeown and Hopkins (2003) argue that if a

commonly held perception does not accurately cover the intent of a new effort it is wiser to use a new name.

McKeown and Hopkins (2003) summarise the difference between EE and ESD as they were intended at their inception at the various UN conferences that gave birth to them. Sustainable development calls for greater access to education, while basic education is simply not a thrust of EE. Education for Sustainable Development requires a reorientation of education to embrace more principles, skills, perspectives, and values related to sustainability – a call that demands a multidisciplinary effort. The EE community has indirectly responded to this call by attempting to infuse EE into the formal curriculum. The Tbilisi Declaration invested in EE the call for public awareness related to the environment as a key element of the overall education agenda, while Rio invested in ESD, within the text of Agenda 21, the task of addressing social concerns absent in Tbilisi. Both Rio and Tbilisi call for training. However the breadth and scope of ESD training from Rio is more inclusive of social and economic factors, where Tbilisi called for training of professionals whose activities have an impact on the environment.

In international literature the term ESD is used synonymously with other terms such as education for sustainability (EfS), education for a sustainable future (ESF), environmental and sustainability education (ESE), and sustainability education (SE) (McKeown & Hopkins, 2003). These authors credit translation from and between languages as the root of these synonyms. They highlight that the term *sustainable development* does not translate well. This view is somewhat challenged by Sauvé (1999) who carefully delineates the roots and the differences between the terms ESD, ESF and education for the development of sustainable societies. Sterling (2001) has argued for a changed educational culture which both develops and embodies the theory and practice of sustainability in a way which is critically aware. This he calls ‘sustainable education’ (p. 22).

McKeown and Hopkins (2003) conclude that EE and ESD have similarities, yet remain discrete and complementary. They emphasise that it is important that the two maintain separate agendas, priorities, and programmatic development. Sterling (2001) agrees, contending that the multiple perspectives afforded by EE, ESD and related fields are valuable and necessitate the need for us to extend our thinking and practice. It requires us to recognise that these forms of education are themselves in flux and should not become closed systems, but seeds for broader educational and societal change.

McKeown and Hopkins (2003) see the situation as reminiscent to the days of the emergence of EE in the late 1960s and 1970s when practitioners of outdoor education (OE), nature study (NS) and conservation education (CE), which claimed some of the same goals and objectives as the emerging field of EE, expressed concern that the new field would weaken the established fields through depleting membership in professional organisations, increasing competition for participants, increasing competition for a place in the curriculum, and increasing competition for scarce resources. However, although EE emerged, OE, NS, and CE continued. It remains debatable however whether these three have thrived as much as they would have done without the emergence of EE and ESD. These three have influenced EE, and in turn EE influenced them. Research shows that despite formal theory, in the end, it is the educator's personal theory, self-constructed, whether explicit or not, that influences his or her daily pedagogical choices (Sauvé, 1996). Whilst McKeown and Hopkins (2003) claim that they do not see ESD replacing EE it seems unlikely, from a practitioner's point of view, that EE and ESD can exist in the formal school education sector as two distinct phenomena. The complexity inherent in the two concepts, and the perception of an 'overloaded curriculum', means that it is unlikely that practitioners would be able to hold delineated conceptions of EE and ESD that persist to differentiated teaching and learning activities. Either EE and ESD will be regarded as synonymous or ESD will replace EE, being in reality the old EE with a greater emphasis on sustainable practices.

Sauvé (1999) concludes that even with the emergence of all other forms of education related to issues of sustainability the importance of EE cannot be questioned, remaining

a fundamental and unavoidable dimension of contemporary education, even as debates concerning its niche in education and its theoretical foundation rage.

In their review of outcomes and prospects of EE in Scotland Lavery and Smyth (2003) call education focusing on the relations between humankind and its living space in Scotland a *project* that has had different names during its history. They state that in the earlier stages the subject of the project was called environmental education (EE). After 1994 the term Education for Sustainable Development became used in most official documents. They use the term Sustainable Development Education (SDE) as a compromise term between the two, and one that emphasises their essential continuity.

Preliminary field studies revealed early in the study that in the UK and Scottish context the term in contemporary use when one inquires about education regarding the environment and its conservation in policy and educational discourse is Education for Sustainable Development (ESD) while in Zimbabwe the term Environmental Education is used.

The working group of the Zimbabwe Environmental Education Consultative Forum (ZWEECF) that was given a mandate to develop the Zimbabwe National EE policy, inclusive of strategy and sector action plan, define EE in accordance with the definition used by the United Nations in 1977 and which had evolved in the 1997 “Declaration of Thessaloniki”. Their use of the term environmental education loosely means the following:

Environmental education includes varied learning processes that provide opportunities for people to learn knowledge, skills, and attitudes that enable them to act within their community in an environmentally responsible way. These active ways of learning and teaching may take place in formal and non-formal education as well as in informal ways through information, communication and public awareness campaigns.

(Shava, Mtetwa, Muzawazi, Stiles, Nhamo, Magava, & Mabvakure, 2001)

This definition is in accordance with Zimbabwe's changing understanding of "education" which is moving away from a focus on "teaching" to a focus on "learning processes"¹.

The ZWEECF chose to use the term environmental education because, according to them, it is the most common term used by international organisations of educators in English speaking countries, including the Environmental Education Association of Southern Africa (EEASA). It was also the term used in preceding environmental legislation in Zimbabwe. While acknowledging the existence of terms such as *Environment and Development Education*, *ESD*, *Sustainability Education*, *Education for Sustainability* and *Education for Environment and Sustainability*, they understand that these come from various political advantages of situations. They propose that as long as 'we in Zimbabwe agree that our view of EE is broadly inclusive of the concerns that gave rise to the different terminologies we can continue to use the term environmental education' (Shava et al., 2001). Consequently in Zimbabwe the term Environmental Education is used in all official documents and discourse.

When I entered the field to investigate education regarding the environment and its conservation I was primarily interested in the responding practitioners' conception of what the subject meant to them and their practice. For the purpose of consistency I used the term EE in all interviews in both Scotland and Zimbabwe and I mentioned ESD only in instances when that is specifically used in responses or policy documents. The long history of the use of the term EE in policy and educational discourse in Scotland makes me confident that the use of the term will result in no misunderstanding among respondents in Scotland regarding the focus of my inquiry.

¹ Education is seen as a deliberate guidance of learning through all available channels – formal, non-formal and in-formal. Education includes instruction, provision of opportunities for formative experience, and creation of learning environments which are helpful to the learner (Shava et al., 2001).

A recent report by the Alliance of Childhood written by Jones (2004) commented that 'scientists consider childhood the most critical period for cultivating an affinity, appreciation, awareness, knowledge, and concern for the natural world' (citing the work of Cordes & Miller, 2000 who did empirical research in the area). The reason given is that young people are 'more receptive to change and less integrated into the existing economic system of social order'. Zeleny (1999) argues that younger participants are more influenced by interventions because they learn new pro-environmental behaviours more easily than adults, are more interested in environmental issues and improving the environment, and are more eager to present themselves as pro-environmental if they interpret that to be more socially desirable. Jones (2004) citing Hart (1997) states that as it is not clear how or why young people develop such a concern for the natural world, this aspect needs to be nurtured. Education seems a natural place to begin such nurturing.

Young people, an obligatory audience for environmental education in schools, through their compulsory education from five to 16 years old, are in the unique position of being young now, receiving an education that is a result of global societies made up of many nations that are reassessing their use of natural resources (Jones, 2004 citing Hart, 1997). Unlike past generations, a major and growing concern for our generation is the maintaining of the natural environment and systems that support and sustain all life on Earth. Given the mounting degradation of the natural environment and life-support systems by practically all human activities, this concern is likely to deepen in the future. It is thus important for, in particular, intergenerational equity, that effective strategies for environmental protection and sustainable development be incorporated into formal curricula at all levels with the importance they deserve (Nath & Talay, 2004). No doubt partly as a result of efforts within the education system, research has found that young people often appear to be better informed on major environmental issues than their parents. They may therefore serve as effective agents to promote environmentally responsible behaviour in others, possibly influencing families to develop more sustainable lifestyle choices (Leeming, Porter, Dwyer, Cobern & Oliver, 1997). Indeed

many EE programmes, especially in developing countries, have schools modelling desired conservation practices with the added benefit of pupil-to-guardian transfer of relevant knowledge (GreenCOM, 2000). In this way school-based programmes become bridges to change within communities.

Certainly as tomorrow's adults, today's young people will have a lasting effect on the long-term state of the environment (Jones 2004). They will, no doubt, be affected by, and will need to provide solutions to environmental problems arising from present-day actions (Campbell Bradley, Waliczek & Zajicek, 1999) and being young now they have a longer period to influence environmental quality than present day adults (Leeming et al., 1997). GreenCOM (2000) astutely realised that as adults we rely on our children to embrace a level of idealism and selflessness we may have possibly lost ourselves. This is despite an awareness that it is unfair to hold children responsible for changing attitudes and practices, and given the speed of degradation, risky to wait for them to grow into responsible adults.

Nath and Talay (2004) propose that for the protection of nature and the environment, environmental and associated moral studies must be developed as mandatory subjects at all levels of the school curriculum. They believe that the way we treat nature and the environment is fundamentally determined by our attitude to both, and our attitude is shaped by our moral values. And moral values are easier to instil in young uncluttered minds than in adults. In saying this, the authors are being coercive. There is a lot of scepticism about whether adults have the right to 'instil' certain values in young people, or indeed that doing so is educationally effective. Nevertheless research has shown that attitudes developed at an early age are stable over time (Jaus, 1984).

Jaus (1984) studied the effects of just two hours of instruction in environmental education on the development and retention of third grade (8-9 year olds) elementary school children's (n=49) attitudes towards the environment. A pre-test and post-test, control group experiment was done to determine change of attitudes. The same

questionnaire was administered to both control and experimental groups two years later to determine whether attitudes towards the environment persisted over time. The results of this study support the contentions that, 1) minimal instruction in EE is effective in producing highly positive attitudes towards the environment in elementary school children, 2) these positive attitudes are retained over time, 3) elementary school children possess slightly positive attitudes towards the environment without the intervention of formal instruction.

Rickinson's (2001) review of environmental education learning outcomes shows a dearth of information about the kinds of factors or conditions that determine effectiveness in EE initiatives. Research that has taken place into these factors has taken place in non-formal settings or using innovative short-term interventions (Emmons, 1997; Mason & Santi, 1998; Guttierrez de White & Jacobson, 1994 cited in Rickinson, 2001; Farmer & Wott, 1995). Zeleny (1999) found active participant involvement positively correlated to the effectiveness of an intervention in improving environmental behaviour. Emmons (1997) found that direct experience and the influence of role models helped students experience the positive aspects of nature and reduce negative associations. This research was based on non-formal field experience involving 10 Belizian high school students. If in-the-environment instruction is to be useful in promoting cognitive gain however, it would have to be effectively planned and managed (Disinger, 1987). Advance organisers for students and coordination with other modes of instruction promote cognitive gain through field activities. Pre-visit planning, pre-visit preparation and object-oriented activities (Farmer, 1993) and follow-up activities to reinforce and solidify concepts discussed on fieldtrips (Farmer & Wott, 1995) were all found to be important conditions for successful fieldtrips.

Although much can be said about the benefits of fieldtrips in developing desirable EE learning outcomes, research shows that there is an age component that requires consideration. In the 1980s there was a great enthusiasm for including EE in the primary and even nursery school curricula. This enthusiasm was accompanied by a great deal of

empirical investigation that suggested that the environmental skills and potential of young children had up until then, been underestimated, in essence challenging dominant Piagetian theoretical expectations of the capacity of young children. In this background Matthews (1985) carried out a project designed to investigate how six and seven year-olds are able to externalise about space using a variety of iconic, graphic and verbal stimuli. Most notably from this research Matthews showed that children develop their awareness of places about them through repeated contact. By engaging their interest through their own everyday experiences, children's true environmental capabilities are much more likely to be revealed and enhanced. The research confirmed that children show higher levels of environmental skill when dealing with familiar places.

The literature on the age at which pupils are ready for fieldtrips is conflicting. Falk (1983) cited in Disinger (1987) found that most children in the 10- to 12-year age range are ready for and can thrive on day-long trips to novel settings such as museums, outdoor centres and zoos. Martin, Wade, Falk, and Balling (1981) however took the more conservative view that for children between 7 and 13 years of age, novel environments are poor settings for imposed task learning, when compared to familiar environments. In general however it appears that too much novelty can militate against successful cognitive instruction (Disinger, 1987) while real and familiar environments appear to be more effective than unfamiliar environments, even for non-formal EE activities, unless pre-visit instruction is provided (Howe & Disinger, 1988).

The research into factors that influence the effectiveness of EE interventions outlined above has taken place in non-formal settings or using innovative short-term interventions. Rickinson's (2001) review confirms that there is a dearth in environmental learning outcomes research that focuses on the outcomes of regular EE provision within the mainstream school curriculum. The two studies found by this review that do have such a focus, Yeung (1995) and Simmons (1998) are quantitative studies among high school students, both involving the administration of self-completion questionnaires.

This review of literature reveals a gap in information regarding factors that shape effectiveness of regular EE provision within the mainstream primary school curriculum. It is for this reason that the present study seeks to make a contribution in this area by being first and foremost:

An investigation into the factors that shape the projected and real impacts of environmental education in the mainstream school curriculum, with an emphasis on the primary school curriculum (*Research question 1* – see also p.92).

A review of EE learning research in primary and secondary schools by Rickinson (2001) identified three established and three emerging nodes of evidence. The first three relate to *learners' environmental knowledge, learners' attitudes and behaviour* and *learners' learning outcomes*. Emerging nodes were found to be in the area of *learners' perception of nature, learners' experiences of learning*, and *influences on adults*. The present study looks at EE learners' learning outcomes.

Research into the outcomes of environmental learning between 1974 and 1991 focused on knowledge, attitudes or both. Although Leeming, Dwyer, Porter and Cobern (1993) found that only a few studied outcomes related to behaviour changes, due to several studies published in the 1990s Zeleny (1999) and Rickinson (2001) found this area a relatively strong research focus, if not as strong as that on environmental knowledge, and environmental attitudes and behaviours. Research on knowledge, environmental attitudes and behaviours provides information on the outcomes of EE interventions in terms of the extent to which they bring about changes in students' environmental knowledge, attitudes and or behaviours. In general these studies show that EE interventions bring about positive effects on environmental attitudes and behaviour.

There is a strong science education influence within the research evidence on learning outcomes. Much of the evidence pertains to initiatives in the US, Western Europe

(Germany, the Netherlands and Switzerland), with a small number related to studies in the UK, Belize, Mexico and South Korea.

A number of methodological issues have been raised regarding the quality of research in this area. Leeming et al. (1993) highlighted problems with experimental design and unit of analysis. They also found that few investigators collected follow-up data to determine whether observed effects persist over time.

Most studies into the outcomes of environmental learning almost universally seek to evaluate the effects of particular educational treatments (independent variables) on students' environmental knowledge, attitudes or behaviour (dependent variables) through some kind of quasi-experimental pre-test/post-test design. Consequently, much of the evidence available on outcomes is quantitative in nature and utilises outcome criteria that are tightly specified prior to the investigation. The research questions asked are of a closed nature, such as 'To what extent does treatment x change students' attitudes towards y ?' rather than open questions such as 'What impact does initiative x have upon y students?' Rickinson (2001) highlights the exception of Emmons (1997). This study investigated the perceptions of the environment by a group of 10 Belizian high school students while exploring the outdoors. It explored how a non-formal field experience might contribute to the formation of environmental sensitivity, attitudes and concerns. She found that through direct experience and the influence of role models, students were able to experience positive aspects of nature and reduce negative associations. There was evidence of the development of feelings of concern and empathy for the environment, as well as an appreciation of the intrinsic value of protected areas in their country (Emmons, 1997).

In summary it is clear that methodologically research which has been done in the area of *environmental learning outcomes research*, has looked largely at short-term innovations, and has had a pre-test, post-test, control, experimental design. The result is that data available on such outcomes are of a quantitative nature and utilises outcome criteria

tightly specified prior to the investigation. Consequently there is a lack of open-ended research that studies the impact of particular interventions on particular students.

Environmental education efforts are faced with different environmental, cultural, economic, political and educational realities depending on the context of their implementation (Emmons, 1997). Environmental education efforts in developing countries are confronted with challenges different from those faced by developed countries as a direct result of their differing contexts.

Fien (1992) discusses the influence of context on the teaching of EE. He cites Taylor (1986) who states that one characteristic of the contemporary world-system that is relevant to an understanding of the global context of teaching EE is the hierarchy of countries within the world-economy in which four groupings can be identified. These are, a) the affluent *core* industrial nations of the first world; b) the Third World countries in the *periphery* of the world-economy; c) the *semi-peripheral* countries which display characteristics of both core and peripheral countries; and d) the *state-capitalist* planned economies of the Eastern bloc. The particular political economies in these four groupings give rise to different sorts of environmental problems. Through their influence the core and semi-periphery countries drive a consumer ethic that leads to over consumption of resources, high levels of pollution and severe waste disposal problems. As a member of the Organisation of Economic Co-operation and Development (OECD) the UK is part of this group of core and semi-periphery countries, which in 1990 comprised 24 countries representing 16% of the world's population, owned 78% of road vehicles, consumed 50% of the world's energy and accounted for the destruction of 73% the world's forests in timber imports (Fien, 1992).

In contrast at the periphery of the world economy, poverty causes people in Third World countries to overexploit their natural environment in order to survive. Pastures are overgrazed and soils eroded, resulting in rapid desertification, forests and mineral

resources are exploited and sold cheaply to transnational companies and cities remain underserved and unhealthy due to poverty (Fien, 1992).

Fien however argues that despite their varying causes in different parts of the world, there are many common aspects of the global ecological crises. These relate to the unsustainability of modes of food production, levels of resource extraction and demands for consumer goods.

Context is an important element in understanding the nature of the curriculum in any field and its goals. Curriculum is a contextualised social process, shaped by contextual influences within and beyond the classroom (Fien, 1992). Fien sees the importance of contextual understanding as particularly challenging to environmental educators because the central focus of EE challenges dominant social structures. He discusses critical curriculum research literature that identifies two related and nested levels of context, a) the macro-context, this is the broad socio-cultural context and the administrative context of the education system, and b) the school or institutional context and the classroom context which form the micro-context.

From a macro-sociological perspective Bernstein (1986), cited by Fien (1992), proposes that government policies are strongly influenced by social and economic processes and trends in the world economy. Education is one agency governments use for social control and reproduction of culture. Educational implications of global and national processes are contextualised in the educational policies. These are then recontextualised through the education system in syllabuses, guidelines, traditions, rules and procedures.

Taylor (1998) reports on the results of an international comparative study into the status of EE in primary education in 10 southern and eastern African countries. The study was based on the secondary analysis of existing documentation, recording the status in EE in formal education in the two regions. Taylor's research was based on secondary analysis of existing documentation recording the status of EE in the school system of Ethiopia,

Kenya, Uganda, Tanzania, Malawi, Zimbabwe, Zambia, Mozambique, Namibia and Botswana. In the case of Zimbabwe the study found no EE in the country's education policy. It found limited EE in the curriculum which was included in environmental and agricultural science. Environmental education was found to feature in exams with 80% of the questions limited to factual recall. There was no EE in pre-service teacher training except for one college and no EE in-service teacher training. There were EE instructional materials but these were largely unavailable. The situation found in Zimbabwe was reflected to greater and lesser extents in the other nine countries, common issues being a lack of comprehensive provisions for EE in the education policy, deficiencies in teacher training, and a lack of instructional materials. Taylor concluded that in general EE in most African countries is ineffective at national level, requiring more resources and expertise. The contemporary state of EE in Zimbabwe is outlined in the discussion of the context of EE in Zimbabwe (Chapter 5).

Broader issues of education planning facing African countries include providing access for all age-eligible children to primary education, a goal that continues to be elusive to many (Taylor, 1998; GreenCOM, 2000; Bekalo & Bangay, 2002). In Ethiopia Bekalo and Bangay found an imbalance in school provision between the rural and urban areas, with most schools being located in urban areas. As long as the provision of adequate primary education has not been accomplished the development of EE may remain peripheral to the support of initiatives that aim to address the fundamental needs of primary education in the region. According to McKeown and Hopkins (2003) for many nations the path to sustainable development begins with greater access to basic education. Chapter 37 of Agenda 21 declares that 'A country's ability to develop more sustainably depends on the capacity of its people and institutions to understand complex environment and development issues so that they can make the right development choices'. Hence, the definition of basic education has expanded beyond the capacity to read, write and cipher. Where numeracy and literacy alone may, in the past, have ensured economic prosperity for individuals and nations, today's complex international

milieu calls for a broader understanding of interconnections among society, economy and environment.

There is often a gap between policy and practice in the classroom. Although Taylor's (1998) study showed that Kenya has had EE in its education policy since 1988, and has EE within the curriculum – infused into social studies, science, agriculture, and home economics, as well as appearing in a limited fashion in examinations, Ho (1998) found that only 63% of Kenyan teachers often delivered EE in their general classroom teaching. The remaining 37% rarely or never did so. Teachers however expressed a high verbal commitment to the need to integrate EE into their normal lessons. Similarly in Ethiopia Bekalo and Bangay (2002) found a mismatch between the intentions of the official curriculum and that delivered in the classroom, with recommended experiential learning sacrificed on the altar of exam success.

African countries often find themselves of necessity having to take an instrumental approach to EE. This instrumental stance values education as a means to an end (Sterling, 2001, p. 25). An example is Kenya, an agricultural country in the process of rapid agricultural modernisation. For this country an instrumental approach to EE would mean for example, preventing soil erosion for the purpose of ensuring agricultural incomes to ensure survival and social stability (Ho, 1998). This approach extends to the teaching of practical skills leading to possible self-employment for learners. This is important as African countries face high unemployment of school leavers. In Kenya, the education system, especially in rural areas, is designed to encourage self-employment, and the promotion of positive attitudes towards manual and agricultural work. Primary education is seen as the preparatory phase in training for self-employment. For this reason teachers view it as vitally important for students to know about the practical skills of environmental conservation from EE as preparation for their future life – particularly their adaptation to agricultural life (Ho, 1998). However Sterling (2001) states that any phrase conjoining 'education' and 'for' implies an element of instrumentalism (p. 25).

Taylor (1998) citing the work of Wright and Govinda (1994) states that in the southern and eastern African region the primary school age population represents a high percentage of the total population, ranging from 30% in Ethiopia to 17.7% for Tanzania. As a consequence, he argues, this makes the provision of EE in primary education a vital opportunity to deliver the aims of sustainable development to a large proportion of the citizenry of each country. GreenCOM (2000) however found that although indeed it is the case that elementary schools provide the largest available base for EE operations, enrolment is often low and there is considerable drop off at secondary school level. In Mali, only 23% of children, and 17% of girls are enrolled in primary schools. In Tanzania, 74% enrol in primary schools but only 15% go on to secondary education. In Zambia, 83% of children enrol in elementary schools but only 25% go on to secondary education (GreenCOM, 2000). For Ethiopia Bekalo and Bangay (2002) cite UNICEF figures of gross enrolment rates for the years 1990-1996 which estimated at 39% of boys and 24% of girls were enrolled in primary and 12% of boys and 10% of girls in secondary. In addition 17% of students who start secondary school fail to complete.

It is clear therefore that on purely numerical grounds the scope of formal education as a medium for mass 'broadcast' of EE is limited in cases of low enrolment of age-eligible learners (Bakalo & Bangay, 2002). School-based programmes in such countries thus reach only a segment of children. Limitations are even greater for girls – exponentially so for programmes that target older children (GreenCOM, 2000).

An interrelated and often worsening cycle of environmental degradation and growing poverty has been found to complicate and impact upon the demand for, retention and supply of education in Ethiopia (Bekalo & Bangay, 2002). Poverty is both a cause and effect of environmental damage and in order to address the one, the other must also be addressed. The authors cite Basic Education System Overhaul – United States Agency for International Development (BESO-USAID) (1994) and Mehran and Tilak (1997) whose work illustrates growing evidence which suggests that under conditions of extreme poverty, even when schools are available, parents keep their children at home to

help with chores and to generate income. This is in sharp contrast with a general agreement that without broad quality education the potential of individuals and the nation to overcome socio-ecological and economic problems will be severely restricted. They contend that EE which places an emphasis on the pressing socio-ecological and economic problems and offers relevant practical education is essential in overcoming sustainable development challenges.

Ogunyeni (2005) agrees, proposing that EE and ESD calls for new processes, less oriented towards instruction and more oriented towards action for sustainability. The principles of sustainability require immediate application of knowledge to demonstrate gains, with less emphasis given to traditional paper-and-pencil achievement tests. This call, however, finds challenges in a post-colonial Africa where the stratification of education systems during the colonial era, into highly academic schools for expatriates, and schools for locals with a curriculum that attempted to be relevant to agriculture and local community concerns, resulted in such schools being identified with attempts to keep the colonised in an inferior position (Vulliamy, 1987). To this day the result is a valuing of schools extrinsically for their ability to promote mobility out of the subsistence sector to formal sector jobs *via* certification through national examinations, rather than intrinsically for any knowledge and understanding found in them. Thus in the past parents and students in Third World countries have rejected innovations that are not consistent with the prevalent routes to high status examination success. Added to this, as long as students' performance in such national examinations remained a critical criterion by which teachers' performance was judged by school inspectors then teachers had very little motivation to make wider contributions to the community (Vulliamy, 1987).

Knamiller (1983) contends that in developing countries certification, the major role of the school, acts against rural development, for successful and semi-successful clients of the system tend to migrate to the cities where they 'try their luck' in a relatively decreasing job market. Few succeed, yet they leave behind communities crying out for help in tackling survival and development problems of food, water, fuel, health and

housing. To him, it seems only logical that the school should concern itself not only in certification, but also with local community issues. However, where parents and students in developing countries see the school as a way out of rural poverty Bowers (2004) contends that on the contrary (Westernised) educational systems are bureaucratised and market-oriented, supporting an economic system that creates poverty in developing country contexts while fostering hyper- and ecologically destructive consumerism.

According to Ogunyeni (2005) policy issues facing Nigeria and African countries in general include poor and/or irregular teacher remuneration; poor funding for education, including teacher education; political instability, which makes policy continuity difficult; and governments' failure to match words with actions and demonstrate leadership in ESD. He sees good governance as primary to the promotion of ESD – legal frameworks, education and policy come secondary to it.

Developments in EE in Europe and central ideas governing that development are outlined by Filho (1996). The European Union (EU) has a number of legal provisions endorsed by the European Parliament that oblige member countries to follow sometimes strict environmental criteria. For example, it is a legal requirement for EU countries to follow the recommendations from Agenda 21 (Filho, 1996). In 1988 the Committee of Ministers for the Council of Europe approved several recommendations aimed at fostering EE among EU members. These begin with an exhortation to note the basic principles for the promotion of EE from the various conferences that shaped the methodology when creating or reviewing EE policies. In 1992 the Commission of the European Communities published *Towards Sustainability*, a document which acknowledged the need for promotion of environmental information as a means of building public environmental awareness towards the goal of sustainable development. The document describes the concern with which EU countries regard environmental issues and emphasises the need for sustainable development. This document is a link between environmental conservation and economic activities. Environmental education has become well established in Europe, widely acknowledged as an important tool in

environmental conservation processes as well as being a methodology that can change attitudes toward the environment leading to the improvement of habits and behaviours. Many countries in Europe are actively pursuing the goal of systemising the development of EE.

Activities in Scotland may be seen against a backdrop of events in the UK and in Europe, all of which in turn are influenced and often guided by key international initiatives signalled by names of places – Stockholm (1972), Belgrade (1975), Tbilisi (1977), Moscow (1987) which defined sustainable development, Rio de Janeiro (1992) the first conference on the world's environmental future to be attended by heads of state and government, and which gave the world Agenda 21 as an action plan for progress, Thessaloniki (1997), and Johannesburg (2002) where governments were called to account on their progress ten years after Rio.

Through its membership of the European Union (EU), the United Nations (UN), the Commonwealth, the G7 group of major industrial nations, and many other multilateral organisations with more specific concerns, the UK, necessarily, plays a prominent role in the international framework (HMSO, 1994). The UK has, in fact, been involved in a wide range of international environmental and conservation bodies well before Earth Summit times. It has successfully pressed for a tightening of controls on chloro fluoro carbon (CFC) emissions through the Montreal Protocol on Substances which Deplete the Ozone Layer; enhanced protection for some of the world's most vulnerable species through the Convention on International Trade in Endangered Species (CITES); participated in the intergovernmental negotiations aimed at producing a convention on desertification. The UK is also active in a number of new organisations associated with the Earth Summit process (HMSO, 1994).

Within Europe, environmental policy in the UK is inextricably bound up with EU policy and much of its environmental protection legislation is developed in common with other EU member states. Examples are water and air quality, waste management, wildlife and

habitat protection, dangerous substances and environmental impact assessment (EIA). The EU has a role in implementing agreements reached in the wider international fora, such as global agreements on climate change and protecting the ozone layer. Within the Community, member states have responsibility to act when this is the most effective means of achieving Community and international environmental objectives (HMSO, 1994).

Environmental education developments in Scotland have been relatively independent of international events, although parallel to them. In their review of outcomes and prospects of EE in Scotland Lavery and Smyth (2003) outline the development of Sustainable Development Education (SDE) (a compromise term they use for EE and ESD) in Scotland and its political and global context from pre-1972 to 2001. From the 1970s, when an attempt to promote EE in Scotland was begun, to the present there has been an increasing acceptance of the sustainability agenda. It is presently a key determinant of policy in the current government. Although not included in the primary aims of education in Scotland as defined by the National Priorities for Schools (SEED, 2000a) SDE is a second level aim within citizenship and values. It is included in the 5-14 curriculum guidelines for schools (SEED, 2000b). Further, sustainable development is a major emphasis in Citizenship Education in the school curriculum in Scotland (Lavery & Smyth, 2003).

In many ways EE developments in Scotland have been pioneering. Scotland was the home of biologist, pioneer town planner and educator Sir Partrick Geddes (1854-1932). A visionary, his writing about education and environment, about synopsis and synthesis, multidisciplinary and the direct relationship between environmental quality and our own quality of life prepared minds and attitudes for what was to come half a century later. He has been called the father of environmental education and although he did not use the term himself his writings contain much which could be quoted in support of a holistic approach to education in its environmental context (Smyth, 1998). Scotland is also the country of birth and was home, until his death in early 2005, of Professor John

Smyth, recognised nationally and internationally as one of the founders of EE. A life spent advising, supporting and encouraging countless national and international organisations and individuals in their efforts to establish EE policies and programmes throughout the world, and in Scotland, led to many key roles in the international and national scene. He was one of the writers of the first internationally accepted definition of EE which was agreed at the World Conservation Union, in Nevada in 1970. He was a member of the UK delegation that went to the first UNESCO Intergovernmental Conference on EE held in Tbilisi in 1978 – the conference which identified the aims, objectives and pedagogy of EE and called the governments of the world to pay attention to EE. He was largely responsible for Chapter 36 of Agenda 21, the education chapter. He was responsible for Scotland being the first country in the world to prepare a sustainable development education strategy (Baines & Geesteranus, with Reid, 2005). Overall John Smyth was a key influence in the pioneering role Scotland has played in the UK and the world in the area of EE.

An aspect which has put developments in Scotland ahead of its time is that many of the prime movers of the EE movement were people active in planning and education, associated with inner-city problems and regeneration, and not as is conventional in other places, people concerned with the rural environment and nature conservation. In the 1990s, when Tilbury (1995) identified the new focus on ESD as being associated with relevance to society and to students as much as ideas of environmental quality – holistic, values-oriented, issue-based, action-oriented and critical – she was identifying issues that had been current in Scottish discussions, if not actions, in the 1970s and 1980s (Lavery & Smyth, 2003).

A group of Her Majesty's Inspectorate (HMI) of Schools produced the HMI Report on *Environmental Education* (1974), known also as the Gilbert Report (Scottish Education Department, 1974). This report, built on a concept of EE comprising empirical, synoptic, aesthetic and ethical elements, lifelong learning, holistic, permeating, critical and more was ahead of political thinking at the time and while it was enthusiastically received

outside Scotland, at home it coincided with changes in local government and in the school education system and was effectively shelved (Scottish Office, 1993, p. 5; Smyth, 1999). However it did significantly affect subsequent developments outside the political system, at home and abroad, influencing post-Stockholm thinking in Europe. It also stimulated several local initiatives, albeit largely unofficial. This included the formation of the informal Strathclyde Environmental Education Group whose method of working created a model for later initiatives (Lavery & Smyth, 2003). The drawing of the Scottish National Strategy in 1995 benefited from the advanced thinking in this pioneering document.

Scotland was working on its national strategy at the same time as Agenda 21 was taking place, and the processes were not unconnected., and overall it was the first country in the world to have a sustainable development education strategy, having developed it at a time when other countries were being called to do likewise. In 1994 Scotland was the only home international in the UK that had an EE strategy. It was also pioneering in the initiation of changes in teacher education, and promotion of Education 21 (Lavery & Smyth, 2003; Smyth, 1999). The Education Task Group of UNED Forum launched 'Education 21' a few years after the Earth Summit in 1992. Education 21 sought to involve all members of the 'education community' in implementing the summit's Agenda 21 programme. Education 21 Scotland is an alliance of over 50 organisations representing civic society, business and voluntary sector. The alliance is 'committed to education consistent with a sustainable future' (Sterling, 2001, p. 65). The alliance has been campaigning to make sustainable development a national priority in Scotland.

Despite this head start the subject still faces problems in Scotland today. Lavery and Smyth (2003) identified these problems as stemming from an increasing lack of a clear government lead and fragmentation of effort. They conclude that the project of EE and ESD in Scotland has failed in its primary aim of embedding SDE in education at all levels. Despite the recognition of the importance of sustainable development at high levels, the development and implementation of policy on at least three occasions, and

widespread support of teaching and learning from the public and the grassroots, Scotland has not fulfilled its promise and begun to implement Agenda 21 in Education. The authors point out that the failure has been due to a series of difficulties in engaging SDE policy-making within the complex politics of the policy-making system as a whole. There is no evidence of lack of political will, but this has not been great enough to overcome administrative failures and conflicts of interest. Consequently, in spite of advantages of size, good governance, an early start and a political and public climate favourable to sustainable development, Scotland has failed to establish an education system reoriented to it, of the kind called for by Agenda 21 (Lavery & Smyth, 2003).

Many reports and critical analyses have emerged from various parts of the world in efforts to provide local perspectives on the status of EE (Hart & Nolan, 1999). Reviews from Scotland (Smyth, 1999), parts of eastern and southern Africa (Taylor, 1998), Northern Ireland, Uganda, Guyana, Korea, Germany, England and Wales, New Zealand, South Pacific (cited in Hart & Nolan, 1999) have been produced and they contribute to a global EE portrait. These reviews reveal that EE is at different stages of an evolutionary process in different parts of the world, and so a multitude of cultural factors face researchers when presented with the notion of toward 'global sustainability' or 'best practice' ideals. The review concludes that much work remains to be done in the area of cultural research in EE, research that is more ontologically based so that western goals and evaluative criteria are not applied globally.

A study of the portrait of Scotland provided by Smyth (1999) and that of Zimbabwe provided in Taylor (1998) reveals that while looking at the broad trends and status of the subject, these works have not looked in detail at how policy translates to practice on the ground. It is this that my research seeks to address. While investigating the factors that shape the projected and real impacts of EE in the mainstream school curriculum the present study acknowledges the importance of the context of implementation. To study how context determines factors that shape the impact of EE, two contexts, a 'developed' country and a developing country are studied. Scotland, because of its historically

pioneering role in EE, and Zimbabwe, my home country, a 'developing' country geographically located in southern Africa will be used as case studies. The purpose is to learn from and inform stakeholders about good practice in EE in these countries, at this level and in this sector. Selection of case study schools within each nation will thus be based on 'good practice'. Specifically this research examines:

The nature of environmental education in each country, as exemplified by schools identified as displaying 'good practice' (*Research question 2 and 3 – see also p.92*).

Environmentally responsible behaviour, the action dimension of environmental consciousness, is a learner trait and domain that has been examined less extensively than attitudes and understanding (Iozzi, 1989). Ramsey and Rickson (1977) proposed a linear model of changing behaviour that states that, "increased knowledge leads to favourable attitudes...which in turn leads to action promoting better environmental quality". This model underpins a lot of EE interventions. The validity of this linear model has however not been borne out by research (Hungerford & Volk, 1990) and has long been discarded by health educators (Scottish Office, 1993, p.34).

In the 1980s researchers in the field carried out several studies into variables involved in environmental citizenship behaviour. These studies were the basis of a landmark publication by Hungerford and Volk (1990). This paper was delivered at the 1990 'World conference on education for all – meeting basic needs', which was part of the UN proclamation of 1990 as the "International Year of Literacy" (Hungerford & Volk, 1990). The paper presents a summative model of previous research by Borden (1984-85), Borden and Powell (1983), Holt (1988), Koslowsky, Kluger and Yinon (1988), Marcinkowski (1989), Ramsey (1989), Sia, Hungerford and Tomera (1985-86), Simpson (1989) and Sivek (1989) all cited in Hungerford and Volk (1990). These studies coupled with the Hines et al. (1986) model were used in drawing a behaviour model of variables involved with environmental citizenship behaviour. The Hines et al. (1986) model had

been developed on the premise that one of the major impediments to the accomplishment of the goal of EE – to develop environmentally responsible and active citizens, was the lack of knowledge of those factors which have formative effects on the development of environmentally responsible behaviour. The Hines et al., model is based on a meta-analysis of the results of an exhaustive search of environmental behaviour research conducted over the previous decade. The authors found the following variables to be associated with responsible environmental behaviour: knowledge of issues, knowledge of action strategies, locus of control, attitudes, verbal commitment, and an individual's sense of responsibility. Locus of control refers to an individual's belief in being reinforced for a certain behaviour (Hungerford & Volk, 1990).

Hungerford and Volk's (1990) environmental behaviour model is based on component objectives of EE as laid out in the 1977 Tbilisi Intergovernmental Conference on Environmental Education. It departs from traditional simplistic assumptions that if people are made more knowledgeable about the environment and its associated issues, then they become more aware of the environment and its problems and thus become more motivated to act toward the environment in more responsible ways (Ramsey & Rickson, 1977). They found instead three types of variables involved in environmentally responsible citizenship behaviour in the literature (*Entry-level*, *Ownership* and *Empowerment*) and hypothesised that they act in more or less a linear fashion, though a complex one. These variables are displayed in Figure 2.2.

According to Emmons (1997) the models by Hines et al. (1986) and Hungerford and Volk (1990) show how a behavioural manipulation of many variables can result in people's participation in desirable behaviours. These works went beyond earlier explorations in environmental action and behaviour and have helped guide innovations in EE practice (see Ramsey & Hungerford, 1989; and Volk, 1993).

The importance of Hungerford and Volk's (1990) model is the emphasis on the point that *Ownership* and *Empowerment* variables are critical in the development of appropriate attitudes and behaviour. Knowledge alone is not enough.

The Hungerford and Volk (1990) publication plays an important role in the present study as it will be used to chart the development of environmentally responsible behaviour by the various EE programmes investigated (see also p.108). This key role makes it important to verify that the Model has not been discredited by further research since the time of its publication. To this end the following section presents research into the predictors of environmental citizenship behaviour such as those included in the Hungerford and Volk (1990) Model and published from 1990 onwards.

Traymor (1990) suggested that the following things are essential for shaping attitudes and behaviour, 1) providing enjoyable and memorable encounters with the local environment; appealing to the emotions as well as the minds. This is based on the philosophy that children who have happy and positive encounters with nature are likely to become protective of it. By the same premise the same should be true even for urban environments, 2) encouraging the development of an enduring environmental ethic; providing clear standards of behaviour and high quality role models, 3) by promoting optimism and giving people a sense of their own power to solve problems, 4) getting people to do something for the environment.

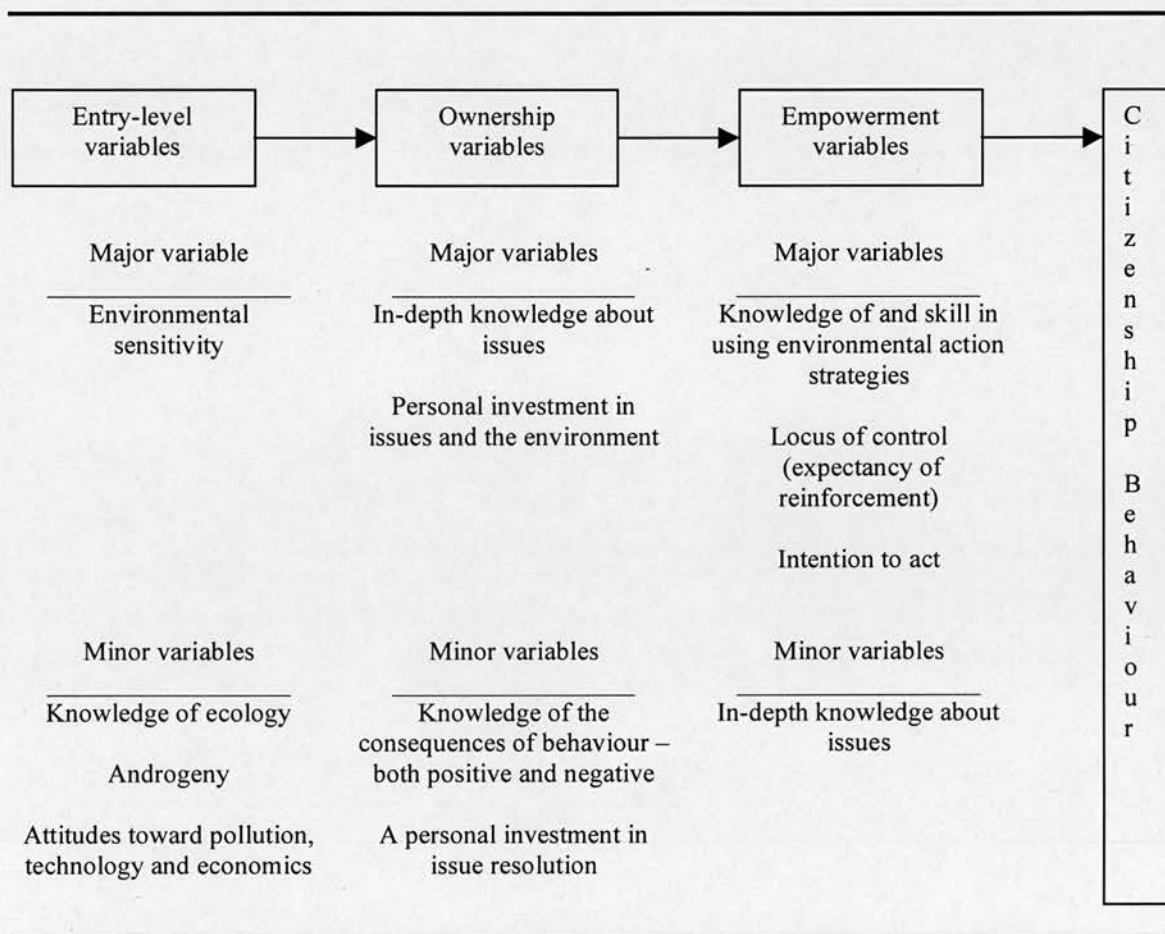
Zimmerman's (1996) review found evidence that knowledge, awareness and concern are correlated. He concluded that although there appears to be a relationship between knowledge and affect in EE, there remains a need to determine their reciprocal impacts. Overall the evidence supported the need for developing attitudes along with knowledge.

Later works by Yount and Horton (1992) and Hicks (1993) (cited by Hart & Nolan, 1999) found no simple cause-effect cognitive-affect-behaviour relationship among college students after they attended an environmental science course, or among high

school students. Hicks' (1993) work indicates that the relationship between knowledge and action is a complex one, involving personal variables such as locus of control.

Figure 2.2 Environmental Behaviour Model: Major and Minor Variables Involved in Environmentally Responsible Citizenship Behaviour

(Source: Hungerford and Volk, 1990, p. 11).



Campbell Bradley et al. (1999) carried out a study to help address the question of whether increased knowledge concerning the environment could improve students' environmental attitudes. They evaluated the effect of a short-duration environmental science course on environmental knowledge and attitudes among high school students (n=475). They found that knowledge and attitudes were correlated, with a direct relationship between pre- and post-test knowledge and attitude scores. They concluded

that the results suggest that increased environmental knowledge may help improve environmental behaviour. The problem with these results is that the authors do not say what kind of knowledge was taught during the course, just what topics were taught. This is unfortunate as Jensen (2002) states that the type of knowledge taught is significant to the outcomes. Jensen (2002) discusses environmental knowledge and its position in working with environmental problems. They evaluated actions taken by all pupils in three schools in an EE project carried out in the Danish Town Jægerspris. Pupils were required to develop their own visions and take adequate action in order to realise them. From the results he argues that knowledge is one of many preconditions for the development of competence leading to action and behaviour change in relation to the environment. He states that traditional knowledge about the environment as it is taught in schools is not action oriented, but focuses on passing on knowledge to pupils. It does not give them the opportunity of actively appropriating and internalising that knowledge. He thus argues for action oriented knowledge if the goal of EE is to develop the students' ability to act and effect change. In this regard he is in agreement with Ramsey and Hungerford (1989) who carried out experimental research on the effects of issue investigation and action training on behaviour. They found that training directed at issue analysis, investigation and resolution promoted responsible environmental behaviour among eight, heterogeneously grouped, seventh-grade classes (12-13 year-olds) from Illinois, Kentucky and Missouri. It promoted the specific knowledge, skills, and beliefs critical to responsible environmental behaviour, fostered knowledge of environmental action skills, and significantly, promoted both group and individual locus of control. Knowledge of action strategies and actual use of these skills may result in a motivational sense of competence and confidence (Boerschig & DeYoung, 1993).

Jensen (2002) proposes a model consisting of four different aspects of action-oriented knowledge through which any given environmental problem can be viewed and analysed. These knowledge aspects are: effects (what?), causes (why?), change strategies (how?), and visions (where?). Traditional EE is placed in the effects knowledge axis, concerned mostly with the effects of environmental problems. This type

of knowledge is not necessarily conducive for action. It may result in weakening commitment and paralysis if it is not supported by insights into causes and strategies for change. In her paper on the use of a problem solving and action oriented approach to environmental education McKisson Evans (2005) describes the fear, frustration and apathy that students develop when enlightened about the full scale of present and predicted environmental problems facing the world. She found that using a project-centred, problem-solving action oriented approach, turned feelings of helplessness into expressions and attitudes of hope, accomplishment, involvement and responsible environmental behaviour. Using this approach is one way that teachers and students can identify and investigate issues and problems of concern to them.

Previously environmental knowledge had been categorised into three levels: a) knowledge about the issue, b) knowledge about the action strategy, and c) action skill (Boerschig and De-Young, 1993; Hines et al., 1986). Whereas Hungerford and Volk (1990) categorised environmental behaviour-related variables into three; *Entry-level*, *Ownership level*, and *Empowerment level*. They suggested that knowledge about a general concept is considered an important *Entry-level* variable, while in-depth knowledge about issues is an *Ownership* variable, and knowledge about skill and action strategy is an *Empowerment* variable.

Hwang, Kim and Jeng (2000) did a study to explore causal relationships among antecedents of responsible environmental behaviour of a model that was based on Hines et al. 's (1986) model of responsible environmental behaviour. They tested their model in a survey involving visitors (n=523) to a forest trail in Kwang-Reung Arboretum, Korea. They concluded that an individual's internal locus of control can bring about positive attitude levels, and that the attitude level does change the intention to act. They found a small effect of general knowledge on locus of control implying that other levels of knowledge, such as knowledge about action skills and action strategies rather than general knowledge about an issue, might be more effective knowledge components to improve locus of control. Locus of control and attitude had a relatively large total effect

on personal responsibility. The effect of personal responsibility on intention to act was small. The researchers concluded that more internal locus of control and attitude about an issue can bring more personal responsibility, but more personal responsibility does not necessarily mean stronger intention to act. They suspected that some other situational factors may affect this.

Culen and Volk (2000) assessed the effects on environmental behaviour of an extended case study that focused on wetland issues with 15 classes of 7th and 8th grade pupils (12 - 14 year-olds) from Illinois and Missouri. Their quantitative study focused on knowledge of ecological foundations, overt environmental behaviour, individual locus of control, group locus of control, knowledge of citizenship action skills and perceived skill in use of citizenship action skills. They found that formal instruction in issue investigation-evaluation and action skills training can produce a positive increase in overt environmental behaviour, to a greater extent than does knowledge and awareness about issues only. Their results were inconclusive on the effects of perceived skill in use of citizenship action strategies. Also inconclusive were the data related to locus of control. The data on knowledge of citizenship action skills, and those on knowledge of ecological foundations were all consistent with positive increase in overt environmental behaviour. They conclude by citing studies by Marcinkowski (1987); Sia (1984); Sivek (1988), Hines, Hungerford & Tomera (1986) to support the proposition that predictors of responsible environmental behaviour include the variables, a) knowledge of citizenship action skills, b) perceived skill in use of citizenship action skills, c) group locus of control, and d) individual locus of control. They state also that the relationship between the six variables assessed in their study and environmental behaviour is complex and not completely understood, urging for more research efforts on responsible environmental behaviour, and on its instructional and curricular implications and effectiveness.

In summary the studies outlined above confirm aspects of the Hungerford and Volk's Flowchart of Predictors of Environmentally Responsible Behaviour (Hungerford & Volk, 1990, p.11) without disputing any significant aspect of it.

It is clear that no simple cause-effect relationship has been proved to exist between knowledge, attitude and behaviour. Research has revealed and confirmed several antecedents of responsible environmental behaviour. These include: knowledge of ecological foundations, knowledge of citizenship action skills, perceived skill in use of citizenship action skills, individual and group locus of control, attitude, and intention to act. Some of a number of studies that have attempted to map the logical links between selected antecedents of responsible environmental behaviour are presented here. While there is a general agreement about what the antecedents are, researchers agree that the business of assessing the logical links between them and with responsible environmental behaviour is a multifaceted and complex task.

While studying the contextual factors that impinge on the effectiveness and impact of EE interventions in schools within the two country case studies, the present study assesses effectiveness of individual programmes by mapping out the degree to which they develop environmental citizenship behaviour. The Hungerford and Volk (1990) model is used as the basis of that exercise. Thus finally this research investigates:

what the contrast of the two countries reveals about the factors that aid and constrain the development of environmental citizenship behaviour in the school context (*Research question 4 – see also p.92*).

The following Chapter presents the Methodology and Research Design. This is presented in two parts. Part 1 presents a report of preliminary fieldwork, the fact-finding efforts of which are the basis of guiding themes used in the national surveys of both countries. It also presents a report on the exploratory study of an EE programme run by Renfrewshire Council, in Scotland. Part 2 outlines the methodology and research design of the main study.

3 METHODOLOGY AND RESEARCH DESIGN

This Chapter sets out to do something that is not conventional in research methodology terms, which is to present findings within the research methodology. The Chapter is divided into two sections, Part 1 and Part 2. Part 1 of this Chapter outlines preliminary fieldwork activities that were the basis of the development of guiding themes for the national surveys done prior to in-depth case studies in Zimbabwe and Scotland. It also presents the findings of an explorative case study of the REEP. This case study was used to test the suitability of using Programme Theory (see Part 2 of this Chapter) to guide data collection and analysis during the main study. The findings of this preliminary case study are presented in full to illustrate case study analysis using Programme Theory. For reasons of clarity and the 'flow' of the analysis this 'complete presentation' is not the approach taken for findings in the main study where in preference certain aspects are presented in Appendix III - VI. Part 2 outlines the methodology and research design of the main study, applying lessons learnt from the preliminary case study.

INTRODUCTION

According to Newman (2003) the field researcher first gets a general picture, and then focuses on a few specific problems or issues. Specific research questions and themes only come about after a researcher has been in the field and experienced it first hand (p. 390). Because of my relative inexperience with the school system in Scotland, and EE in the formal 5-14 curriculum for Scotland in particular, I found it necessary to do a preliminary survey of the field before focusing my research question.

METHODOLOGY AND RESEARCH DESIGN: PART 1

The need to understand good practice in EE in the formal school curriculum and how this global education project is manifest in different contexts was the impetus of my study. The experience of a different context was necessary for me as a researcher and educator. I hoped it would broaden my horizons as to the research possibilities. A contrast between the two countries would help me appreciate more existing areas of



strength and weakness in current practice in my own country. I hoped at the end of the study to emerge with (context bound) theories of what makes for good practice in EE in the formal school curriculum.

Preliminary fieldwork began with a telephone call to Learning and Teaching Scotland (LTS); a conversation that confirmed that EE is not a separate subject in the Scottish 5-18 curriculum, and led to receipt of a complete set of 5-14 Curriculum Guidelines which I studied.

I took up several opportunities to experience the field first hand by joining in some related events. An early one, during the first year of my PhD study, was a John Muir Award training course. This weekend-long event took place in Biggar, Scotland. The John Muir Award is an environmental award scheme focused on 'wild places'. It intends to encourage people of all ages and backgrounds to discover, enjoy and conserve the planet's wild places in a spirit of fun, adventure and exploration, through a structured yet adaptable award scheme (John Muir Award, 2005). My visit to this course gave me an opportunity to chat informally with various environmental workers within the field, from disparate backgrounds. I spoke to teachers from primary and secondary schools. I spoke to a park ranger, John Muir Award personnel, and a commercial outdoor guide. I spoke to employees of a local youth organisation that worked with local school children, involving them in outdoor and environmental education. I asked all these people very open-ended questions about their work; the nature of any links they had with schools; the funding structures for their programmes, and so on. A list of questions used to guide interviews during this preliminary fieldwork may be found in Appendix I, p.398. I tape-recorded these interviews which were an 'eye opener' to me with-respect-to the range of type and size of EE initiatives going on in Scotland. It also made explicit to me the prevalence of 'partnership working' in the provision of EE. These partnerships seemed to permeate all forms of provision. This provoked my interest in the reasons why different organisations oriented toward creating them (partnerships) at various levels despite most individual organisations having quite independent origins (or so I thought).

Following this I realised that non-governmental organisations (NGOs) or voluntary organisations (VOs), as they are more commonly called in Scotland, were an active and apparently important player in EE provision in Scotland. It led me to an investigation of organisations that were involved in such provision in Scotland, especially in the 5-14 curriculum guidelines. This revealed the existence, in the arena, of organisations such as the Royal Society for the Protection of Birds (RSPB), Scottish Natural Heritage (SNH), Grounds for Learning (GfL) and Keep Scotland Beautiful who run the 'Eco Schools' programme (see p.124). The prevalence of partnerships as a way of working in apparently disparate areas of the country pointed me towards the probability that there was a national policy driver behind these relationships. This led to the policy theme of my study. What was the policy for EE in Scotland, and how did this drive the programmes formed and how these were organised, funded and run at grassroots level? An understanding of national policy on the subject would hopefully reveal the reason behind the type of EE programmes running in the country and their organisation. Programmes thus emerged as a major theme in this research.

I carried out informal telephone or face-to-face interviews with representatives of these organisations. This included representatives from Grounds for Learning – Assistant Director, Division of Academic Innovation and Continuing Education, University of Stirling (face-to-face interview), Eco Schools – Eco Schools Manager for Scotland (telephone interview and postal information), RSPB – Head of Education in Scotland (face-to-face interview), and SNH – Area Officer (face-to-face interview). Again I asked open-ended questions about the work of these organisations and how they interfaced with schools (See Appendix I, p. 398 for a list of questions used to guide the interviews. I visited RSPB's Vane Farm nature reserve that is part of the Loch Leven National Nature Reserve, Scotland. I took part in a day of outdoor teaching and learning that involved a Primary 5 class from a visiting school. The Scottish 5-14 Curriculum runs from Primary 1 to 7 (ages 5 to 11) and continues with Secondary 1 and 2 in the secondary school. The activities exemplified the kind of EE work that the centre offers for primary classes. I interviewed the head field officer at the end of the day and she

discussed the type of work they did with secondary schools. She also answered questions regarding the motivations behind teachers bringing their pupils to the centre and the motivations of the centre itself for offering this service. The idea of motivations was interesting. From my experience in Zimbabwe and reading on the subject during my literature review, I was well aware that there is often a 'policy-practice gap', and that often there are other imperatives driving activities in school classrooms. This and the fact that policy alone does not ensure uniformly successful provision in schools, meant that there had to be other drivers. Discussions with my supervisors brought in the idea of values as a vital ingredient and driver of EE at various levels – personal values, as at the end of the day it is individuals who drive policy and individuals who ensure the success or lack thereof of programmes.

I transcribed most of these informal interviews. For the rest I took hand-written notes after listening to them again, supplementing notes I had been taking during the interviews. Interview transcripts, reflections of observations in the field, literature review and discussions with my supervisors resulted in the selection of four guiding themes. These themes are *policy*, *partnerships*, *programmes* and *values* or *underlying principles*. These would provide a contextual framework for describing EE in both countries, guiding the national survey and case studies. Some authors advocate the use of multiple coders to better link such themes with the empirical data from which they are derived (Miles & Huberman, 1994; Carey, 1996). It is however a method more aligned with positivistic research designs than with qualitative methodologies such as those used for the present study. The alternative qualitative research strategy of subjecting these themes to the scrutiny of respondents for verification (Creswell, 2003, p. 196; Smith, 1989, p. 75) was not practical because of the eclectic process of their selection (explained above). These themes are also quite broad so there is little danger of important information regarding formal EE being left out.

As I have mentioned in the introduction to this chapter I came to Scotland familiar with the situation in Zimbabwe, and having explored the situation in Scotland I was

convinced that there were enough parallels between the two countries to warrant use of policy, programmes and values or underlying principles to describe EE in both country contexts. As I have mentioned earlier the fact of partnerships in the provision of EE appeared in a new light after Scotland. Although I knew that some VOs were involved in EE in Zimbabwean schools, partnership in EE provision was just not a concept that had particularly struck me regarding these relationships. However, since partnerships appeared to be associated with good practice in Scotland I decided that it was an element worth exploring in depth in the Zimbabwean context.

Having decided on the contextual framework for the study, I was faced with the decision of how to study EE in the formal curriculum. I was determined from the start that my study would focus on the formal curriculum that, because of its comprehensive provision nationally, has the greatest potential for mass ‘broadcast’ of EE. My focus on the 5-14 Curriculum for primary education in Scotland came about as a result of my experience of the Zimbabwean school curriculum. As a learner, later a teacher, and then a teacher educator and researcher in the Zimbabwean school system I knew that although some EE occurs in the secondary school curriculum through different subjects including agriculture, science, geography, chemistry and biology, the primary school, through Environmental Science and Social Studies, was the place which had the capacity and integrated curriculum structure necessary to provide coherent EE messages. It was also at this level that most VOs in the field supported curriculum activities related to EE.

During preliminary field and curriculum studies in Scotland I did some supply teaching in schools in Edinburgh and the Lothians and through this gained a necessary familiarity with the everyday working and structure of the Scottish primary and secondary curriculum. I remained puzzled however at exactly how a subject like EE, that is not a formal subject in the curriculum, appearing mainly in Environmental Studies in Scotland’s 5-14 guidelines and in Environmental Science in Zimbabwe’s primary school curriculum, could be studied *in situ*. During the course of preliminary fieldwork, I came across and studied the Renfrewshire Council’s guidelines for the 5-14 curriculum. In

these documents I learnt about the Renfrewshire Council Primary 5 Environmental Education Programme (REEP). I decided that it presented a wonderful opportunity to study a primary school EE programme that is *so named*. I hoped that, if nothing else, it would give insight into the definition of EE in real terms within the school teaching and learning context. The decision to study this programme came also at a time when I was looking at the possibilities and practicalities of using 'programme theory' (Rossi, Freeman & Lipsey, 1999) as a lens to guide my study. A study of the REEP would be an opportunity to test how programme theory could be utilised to guide rigorous study of the subject in a school context.

Rossi et al. (1999) define programme theory as the set of assumptions about the manner in which a programme relates to the social benefits that it is expected to produce and the strategy and tactics the programme has adopted to achieve its goals and objectives.

Within programme theory they distinguish:

Impact theory, relating to the nature of the change in the context brought about by programme action,

Process theory, which depicts the programme's *organisational plan* and *service utilisation plan*.

The programme's impact theory consists of assumptions about the change process brought about by the programme and the improved conditions that are expected to result. It is operationalised by interactions between the programme and the target. Such interactions constitute the means by which the programme expects to bring about its intended effects. However to instigate the change process proposed by the impact theory, the intended services must first be provided to the target population. The programme's service utilisation plan is made up of the programme's assumptions and expectations about how to reach the target population, provide and sequence service contacts and conclude the relationship when the time becomes appropriate. The programme however must be organised in such a way that it can actually provide the intended services, personnel, administration and general organisation. This brings in the

subject of the programme's organisational plan. This can generally be presented as a set of propositions:

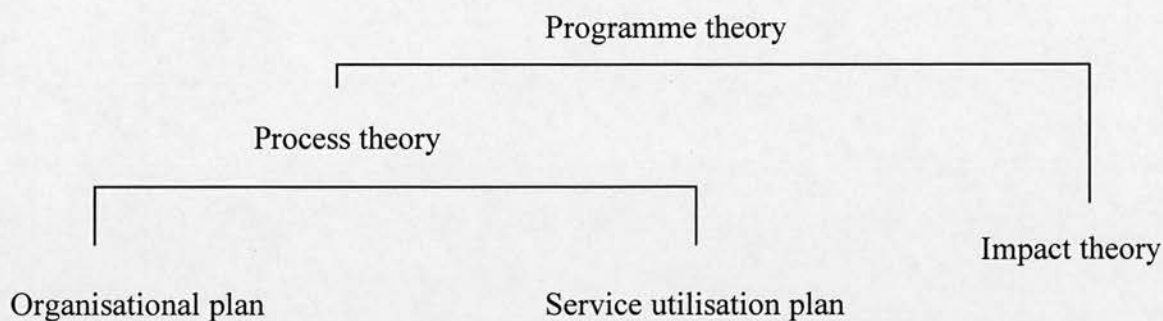
If the programme has such and such resources, facilities, personnel, and so on, if it is organised and administered in such and such a manner, and if it engages in such and such activities and functions, then a viable organisation will result that can operate the intended service delivery system.

(Rossi et al, 2004, p. 141)

A programme's organisation and service delivery system together are often referred to as programme process and the assumptions and expectations on which that process is based may be called the programme process theory.

Programme theory has long been recognised by evaluators as an important basis for designing evaluation research, formulating and prioritising evaluation questions, and interpreting evaluation findings (Wholey, 1979; Chen & Rossi, 1980; Chen, 1990). It is described and used under various different names; for example, logic model, programme model, outcome line, cause map, action theory (Rossi et al, 2004, p. 139). There is no general consensus about how best to depict or represent programme theory, and many different versions are found in evaluation literature. All however, show common elements.

Source: Rossi et al. (1999)



I approached Renfrewshire Council education authority, and got permission to study the REEP. Below is a write-up of the findings of this study and the lessons learnt.

THE RENFREWSHIRE COUNCIL PRIMARY 5 ENVIRONMENTAL EDUCATION PROGRAMME

Background

Environmental education is not a separate subject in the primary school curriculum in Scotland. Teachers and local education authority (LEA) staff are quick to remind one of this if, as a researcher, one asks a question regarding EE. There is however a clear provision for EE in the Scottish 5-14 National Guidelines. The Tbilisi Declaration in 1978 identified the objectives of EE as awareness, knowledge, attitudes, skills and participation (UNESCO/UNEP, 1978). Most environmental educators have since universally adopted these objectives (Thomson & Hoffman, 2002).

The Scottish 5-14 National Guidelines do not prescribe any particular methodology for teaching EE. They admit that there are many valid and effective ways of motivating children to learn, and schools should adopt the approach best suited to their particular circumstances and the needs of their pupils (SEED, 2000b, p. iv). Preliminary fieldwork revealed that what characterises the numerous EE programmes in operation in schools throughout Scotland are different strategies for taking pupils out of the classroom. The

delivery of EE to school pupils in Scotland almost invariably brings together three key players, the local education authorities, various voluntary environmental organisations and the schools. These tripartite relationships are played out in different contexts around Scotland in different and fascinating ways. Any one of the three can initiate a programme and invite partnerships from the other two. A researcher-evaluator who is interested in a holistic picture of EE in Scotland must therefore first look at the provision from the perspective of a national strategy and then the various ways that this is developed in the various contexts around Scotland.

The REEP is an example of an EE programme that was initiated by the LEA. The programme has had a phased development from an initial pilot in March 1999 involving 16 schools. Its conception was triggered by the closure of the Renfrewshire Outdoor Education Centre, Ardentinny. To avert criticism at the loss of this EE facility Renfrewshire Council started this alternative EE programme initially making use of two venues, Clyde Muirshiel Country Park and Glennifer Braes Country Park. By 2002 the programme had expanded to include 49 of the 52 primary schools in Renfrewshire Council. The number of pupils increased from 446 in the pilot phase to 2130 in 2002. Continually on the lookout for venues to run its fieldwork activities, the programme has increased the number of sites it uses to 11 including the option of schools' own grounds. Programme activities link to specific sections of the 5-14 Science curriculum guidelines, specifically 'Living things and the processes of life' (Level B).

Methods

The methods used to gather information required for the explication of the REEP programme theory were informed by the work of Wholey (1990), Rossi et al. (1999), Smith (1989) and Creswell, (1994). Evaluators exploring programme theory operate much like programme ethnographers. They seek to describe and understand the programme through interviews and observations that will reveal its 'social reality' as viewed by programme personnel and other significant stakeholders. The articulation of the REEP programme theory relied on information obtained from structured one-to-one

interviews with two of the programme's managers (the Outdoor Education Development Officer and a Primary School Teacher on secondment who held the post of Staff Tutor – 5-14 Science), a fieldwork tutor from a private outdoor education organisation called Starling Learning, and a manager of one of the nature reserves involved in the programme. These respondents were selected based on recommendations from the Outdoor Education Officer to my request for the names of other useful informants.

The questions asked to clarify programme theory are questions regarding the way activities, events, and other forces are perceived to cause or effect changes in target populations. The interviews were tape-recorded. Further information was obtained from the study of national policy documents, the programme's own policy documents, project plans, publicity brochures, and evaluation feedback from teachers and members of the steering committee. Although the understanding of those persons who originate, plan, administer, and staff the programme was the primary source of information, as the researcher I played a significant and creative role in interpreting and organising that information. The interviews were transcribed and together with programme documents provided information that was fed first into Table 3.1, then after still more vigorous study of the data sources, the impact theory and the process theory were developed. According to Smith (1989):

Causality in any absolute sense cannot be established because programmes contain a variety of components, resources and procedures which come together in as many ways as there are people who run them and clients who are served by them. However, some reasonable estimation of the likelihood of certain actions bringing about other actions or effects are necessary if one is to understand and try to prove or improve a programme's course of action.

(Smith, 1989, p. 49)

The construction of programme theory was an iterative process. The Outdoor Education Development Officer was the major respondent and he was interviewed twice during the process of developing the programme theory. All other respondents were interviewed once. After programme theory had been developed it was validated iteratively with the Development Officer and the Staff Tutor. Necessary changes were made after each

iterative session. There were two such sessions with the Development Officer and one session with the Staff Tutor.

Findings

Information collected on the programme was organised through coding into a conceptual model of the programme showing information on Resources, Activities, Target populations, External factors, Outputs and Outcomes (See Table 3.1). This conceptual model is the REEP *programme theory*. Programme theory pre-specifies the categories of data used to describe it and organises information in a way that makes it easy to identify and isolate information relevant to the impact theory (which relates to the nature of the change) and the process theory (which depicts the programme's organisational plan) (see p.56). It is important to stress that the 'Outcomes' detailed in the last three rows of Table 3.1 (p.62) are primarily what the respondents *claim* during interviews. Some of them are substantiated by empirical evidence shown to me during interviews or otherwise verified by respondents. I verified some of the claims by observing, together with a research assistant, a full day's field activities for the REEP involving a Primary 5 class at one of the outdoor centres. The research assistant acted to corroborate the findings of my observations. The section of the impact theory that contains the findings of this field observation is Figure 3.3 (p.69). There are some claims for which there is no empirical evidence, which programme managers and teachers *hope are occurring*, and others that they *hope will occur* in the future as a result of these activities. What follows is a linear presentation of REEP's logic model. To make it easy for the reader to follow the linear logic model, since it spans more than one page, I have presented, as a footnote at the end of each page of the logic model, a summary of all aspects of the logic model with the ones covered on that particular page highlighted.

Table 3.1 The Linear Logic Model for the REEP – September, 2003

Goals and Objectives (The goal is where we want to be. The objectives are the steps needed to get there.)	<p>REEP GOALS AND OBJECTIVES</p> <p>Primary Goal</p> <p>To add value to what is done in schools by providing all primary age pupils at P4/5 with an outdoor EE experience that is based on practical learning activities</p> <p>Secondary Goal</p> <p>Increase teachers knowledge and confidence in a specified outdoor teaching and learning context</p> <p>Objective 1</p> <p>Move pupils' experiences, observations and understanding to the next step through first hand experiences of living organisms in a fun, interesting way, in an experiential learning context</p> <p>Objective 2</p> <p>Raise pupils' awareness of the outdoors and the living world around them</p> <p>Objective 3</p> <p>Increase pupils' knowledge of the outdoors and the plant and animal world</p> <p>Objective 4</p> <p>Increase pupils' appreciation of the plant and animal world</p> <p>Objective 5</p> <p>Increase teachers' fieldwork experience and knowledge of the environment and specifically the plant and animal world at this level of study.</p> <p>Objective 6</p> <p>Gauge teachers' confidence of leading similar outdoor activities</p> <p>Data sources</p> <p>Programme staff, Programme documentation, Teachers</p>
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Resources/ Inputs ²	<p>A separate budget at council level</p> <p>11 outdoor venues and nature reserves</p> <p>Three staff members at Renfrewshire Council</p> <p>Clerical assistance</p> <p>Photocopying</p> <p>Printing</p> <p>Worksheet distribution (man-hours, transport)</p> <p>Countryside ranger services</p> <p>External service provider (Starling Learning - manpower and expertise)</p> <p>Bus hire</p> <p>Equipment for fieldwork activities</p> <p>Folders for pupils to transport their worksheets to and from the venues</p> <p>Waterproof clothing for the children</p> <p>Toilet facilities at Happy Tots Nursery School and a Linwood Sports Centre</p> <p>Data sources</p> <p>Programme staff, Programme documentation, Countryside rangers, Starling Learning</p>
Programme Activities	<p>Justification of the allocation of resources within the Outdoor Education Budget</p> <p>Locating and developing sites for the outdoor activities</p> <p>Retention of school involvement</p> <p>Creating worksheets specific to the different sites</p> <p>Distributing worksheets to schools (posting, e-mailing, faxing)</p> <p>Liaising with schools on field trip logistics (dates, transport, worksheets etc)</p> <p>Giving out teacher programme evaluation questionnaires</p> <p>Collecting evaluation and other programme information</p> <p>Preparation and maintenance of fieldwork equipment</p> <p>Steering (working) group meetings</p> <p>Fieldwork activities, which are:</p> <p>Water mini-beasts (pond dipping)</p> <p>Woodland mini-beasts</p>

2

Goals and Objectives	Resources/Inputs	Programme activities	Target populations	External factors	Intended short term outcomes	Intended intermediate term outcomes	Intended long term outcomes
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	Habitat mapping Completion of teacher evaluation forms Data sources Programme staff, Programme documentation, Teachers, Countryside Rangers, Starling Learning
Target Populations (Participation) ³	Teachers teaching concerned classes P5 (P4, P6) pupils of Renfrewshire Council primary schools Parents, parent-helpers Data sources Programme staff, Programme documentation,
External Factors (Factors that affect the programme but are outside the control of programme managers)	RSPB Starling Learning Park Rangers Happy Tots Nursery School Linwood Sports Centre Nature reserves Country parks Community woodlands Private woodlands, private garden, private country estate Office move: (a time-limited event.) Foot and mouth disease: (a time limited event that resulted in loss of school bookings at the time, but had the good long term outcome of identification of additional venues for the fieldwork programmes including use of the RSPB Nature Reserve)

3

Goals and Objectives	Resources/Inputs	Programme activities	Target populations	External factors	Intended short term outcomes	Intended intermediate term outcomes	Intended long term outcomes
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Intended Short Term Outcomes ⁴	<p>Pupils develop a range of skills associated with</p> <p>Preparing for tasks</p> <p>Carrying out tasks</p> <p>Reviewing and reporting tasks (Field observations of outdoor centre P5 activities).</p> <p>Pupils have the opportunities to develop a</p> <p>A commitment to learning</p> <p>Respect and care for self and others (Field observations of outdoor centre P5 activities).</p> <p>More use made of Nature Reserves and Outdoor Centres (Outdoor Education Development Officer)</p> <p>Pupils have increased knowledge of the outdoors (Outdoor Education Development Officer)</p> <p>Teachers have increased knowledge of the outdoors (Outdoor Education Development Officer)</p> <p>Children learn to “see” the environment (Staff Tutor)</p> <p>Pupils have increased awareness of the living world around them (Staff Tutor)</p> <p>Children know their local area better (Outdoor Education Development Officer)</p> <p>Value is added to school teaching and learning (Staff Tutor)</p> <p>Children experience different teaching and learning styles (Staff Tutor)</p> <p>Data from fieldwork used in follow up work in science, maths and other subjects (Staff Tutor)</p> <p>Children tell their parents all about it (Outdoor Education Development Officer)</p>
Intended Intermediate Term Outcomes ⁵	<p>Outdoor Centres and Nature Reserves meet their EE objectives (Nature Reserve Manager).</p> <p>Schools continue outdoor teaching and learning activities</p> <p>Teachers develop increasing confidence towards eventually leading similar outdoor activities (Outdoor Education Development Officer)</p> <p>Teachers apply for grants to make school grounds improvements (Outdoor Education Development Officer)</p> <p>Teachers invite Starling Learning to run REEP or similar programme in the school (Fieldwork Tutor from Starling Learning)</p> <p>Teachers take children out more often (Outdoor Education Development Officer)</p> <p>Outdoor activities become a greater part of EE in the schools (Outdoor Education Development Officer)</p>

4

Goals and Objectives	Resources/Inputs	Programme activities	Target populations	External factors	Intended short term outcomes	Intended intermediate term outcomes	Intended long term outcomes
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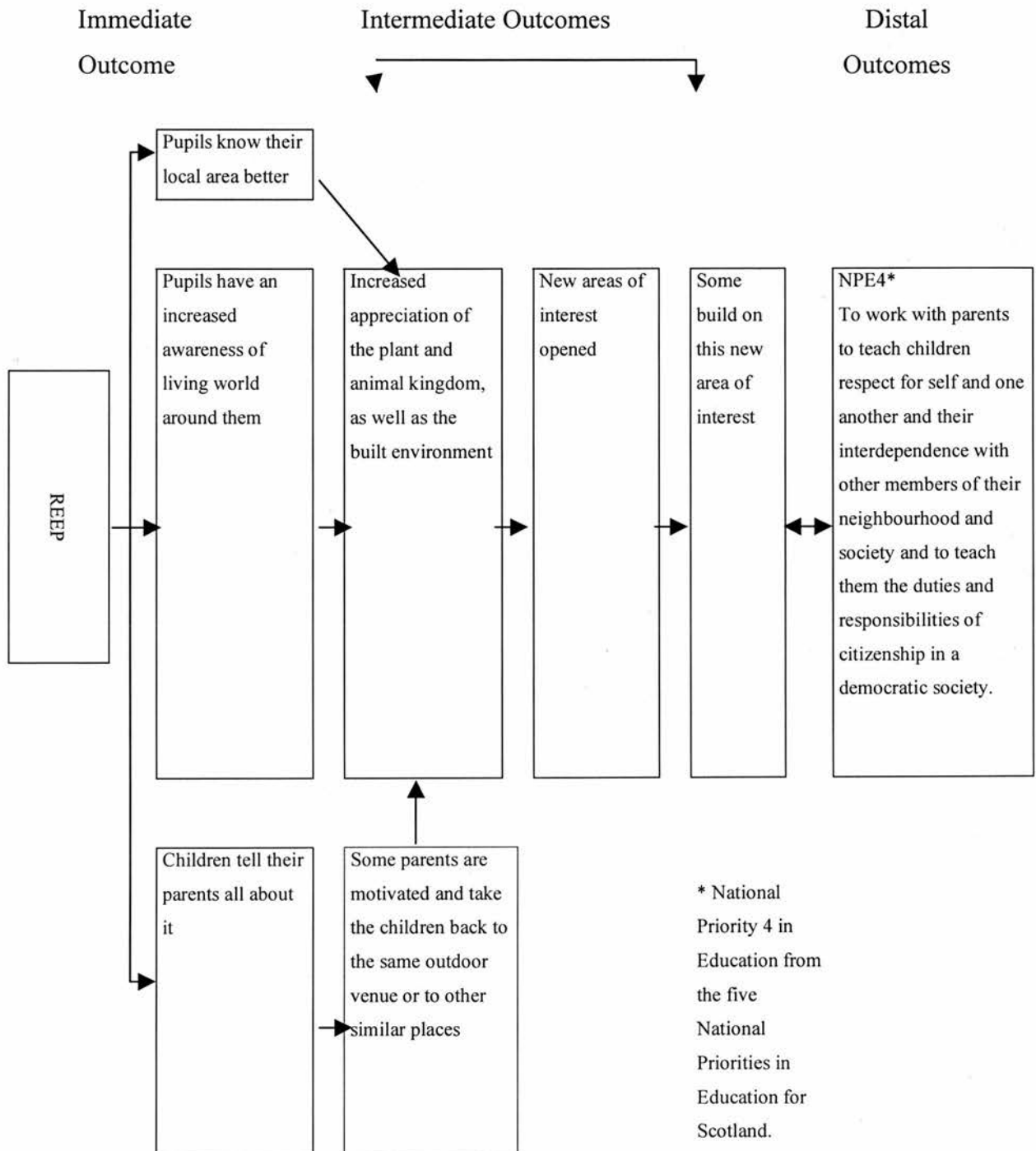
	<p>Increased appreciation of the plant and animal kingdom, as well as the built environment (Outdoor Education Development Officer)</p> <p>New areas of interest opened for pupils (Outdoor Education Development Officer)</p> <p>Some build on this new area of interest (Outdoor Education Development Officer)</p> <p>Some parents are motivated and take the children back and/or to other similar places (Outdoor Education Development Officer)</p> <p>The fieldwork activities contribute to Eco Schools accreditation (Staff Tutor)</p>
Intended Long Term Outcomes	<p>More funds injected into Outdoor Centres and Nature Reserves by their respective funders resulting in Outdoor Centres and Nature Reserves remaining open (Nature Reserve Manager)</p> <p>A contribution towards concerned schools meeting the ideals of the National Priorities in Education⁶ (Outdoor Education Development Officer)</p> <p>Responsible environmental behaviour (Citizenship behaviour) (Outdoor Education Development Officer, Staff Tutor, Outdoor Centre Manager)</p>

In keeping with the model presented in Figure 3.1 it is possible to distinguish from Table 3.1 the programme's process theory and impact theory (See p.56). What follows is the impact theory for the REEP. Primarily because of page size limitation this impact theory is presented as three diagrammes Figure 3.2, Figure 3.3 and Figure 3.4. Figure 3.2 and Figure 3.3 shows the programme's impact on learners, while Figure 3.5 shows its impact on teachers and outdoor centres. Because of its relative complexity Figure 3.3 is preceded by notes and information on data sources (see p.68).

Goals and Objectives	Resources/Inputs	Programme activities	Target populations	External factors	Intended short term outcomes	Intended intermediate term outcomes	Intended long term outcomes
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⁶ The National Priorities are an integral part of the School Improvement Framework set out under the standards in Scotland's Schools Act 2000 and define the outcomes that education authorities and schools aim to deliver for young people in Scotland (<http://www.nationalpriorities.org.uk>).

Figure 3.2 Renfrewshire Council Primary 5 Environmental Education Programme Impact Theory



Data sources and notes for Figure 3.3

In Figure 3.3 all *Entry level* variables (except for environmental sensitivity) were confirmed as the immediate outcomes of the REEP during field observations of REEP activities by the researcher and a research assistant.

The shaded areas of Figure 3.3 are hypothetical progressive outcomes of EE and are adapted from Hungerford and Volk's (1990) Behaviour Flow Chart of variables involved in Responsible Environmental Citizenship Behaviour. This flowchart is discussed in detail in Chapter 2. Programme managers and staff hope that REEP activities will culminate in responsible environmental citizenship behaviour. The hypothetical outcomes in shaded areas are the missing link between observed outcomes and this ultimate aim of the programme, i.e., according to Hungerford and Volk (1990) Ownership and Empowerment variables are important and necessary predictors of responsible environmental citizenship behaviour.

In Figure 3.3 the symbols * and ** are used to emphasise the following:

* that no follow up activities resulting in *Ownership* and *Empowerment* variables were identified for the REEP. Eco Schools is in operation in more than 40 of the 52 primary schools in Refrewshire Council. It is possible therefore that some activities in line with *Ownership* and *Empowerment* are being developed by other programmes such as Eco Schools.

** that environmental sensitivity was not empirically identified through observation. It is however implicit in statements obtained from interviews, though not categorically stated. According to Hungerford and Volk (1990) environmental sensitivity is an *Entry-level* predictor of responsible environmental behaviour.

Figure 3.3 Renfrewshire Council Primary 5 Environmental Education Programme - Impact Theory continued.

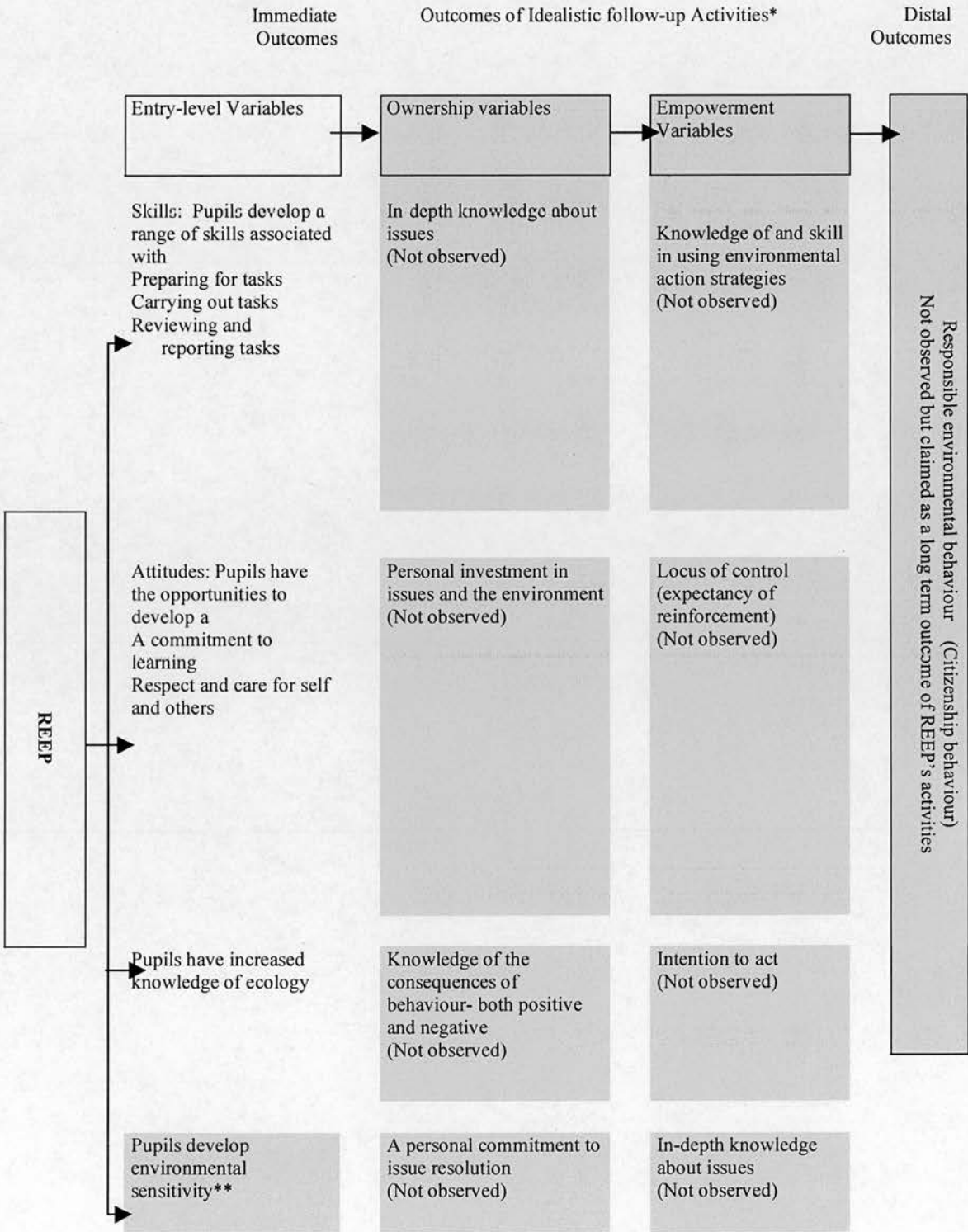
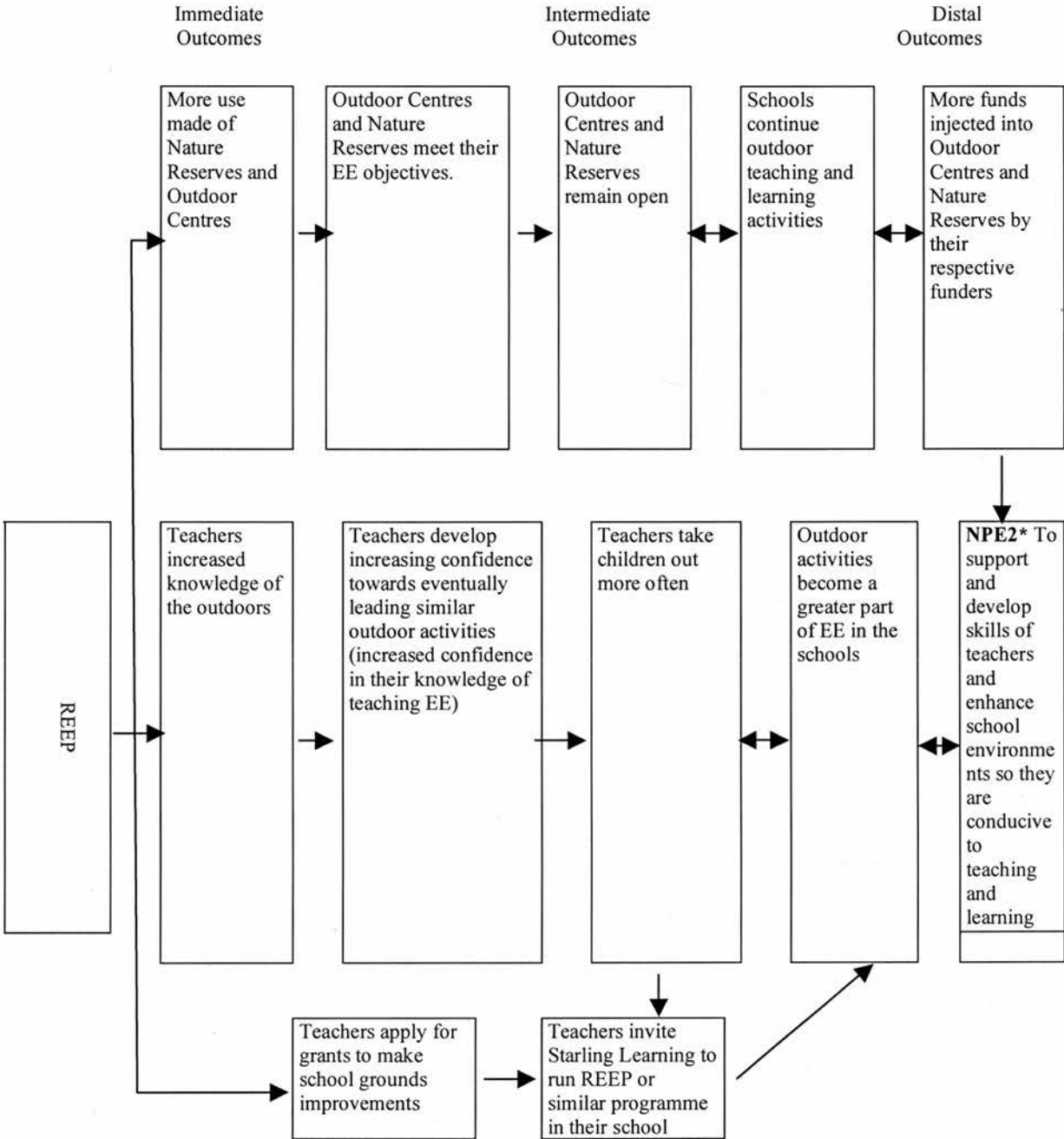
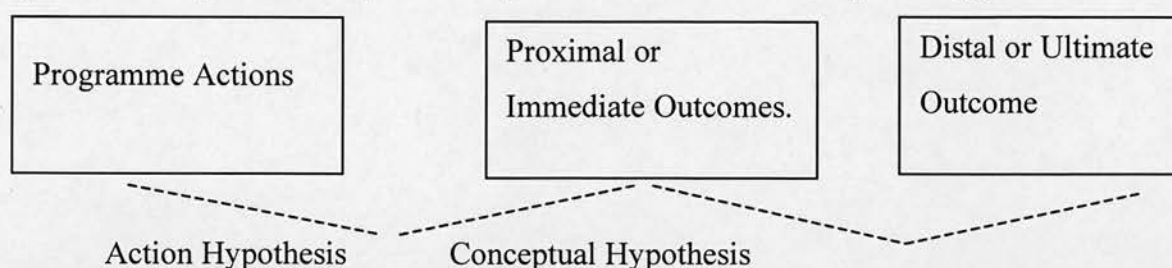


Figure 3.4 Renfrewshire Council Primary 5 Environmental Education Programme – Impact theory



* National Priority 2 in Education from the five National Priorities in Education for Scotland.

Figure 3.5 Programme Impact Theory: The Action and Conceptual Hypothesis



According to Rossi, Freeman and Lipsey (1999) a programme's impact theory may be summarised as shown in the diagram above and the elucidation of a programme's impact theory reveals the distinction between two different sets of assumptions inherent in the programme. The first set of assumptions represents the expectation that the programme actions will have the intended effects on the proximal or immediate outcomes. Chen (1990) refers to this first set of assumptions as the 'action theory'. Rossi, Freeman and Lipsey (1999) prefer to call it the 'action hypothesis', as it is only one link in the impact theory. The second set of assumptions connects the proximal outcomes with the distal ones. The processes linking the proximal outcomes to the distal ones are out of the control of the programme. It is assumed that if the programme does its part in implementing the programme in such a way as to activate the proximal outcomes then the distal intended benefits will follow. Below is an outline of the REEP's action hypotheses. These hypotheses are derivations from interview data and were verified by iteration with programme managers.

The Action Hypothesis for the Renfrewshire Council Primary 5 'Environmental Education Programme'

This programme assumes that many pupils spend a large part of their time after school involved in indoor activities. Therefore they have limited experiences of playing, exploring and finding things in the outdoors. Consequently the pupils are assumed to have limited interest, or awareness of the living creatures in the environment around them. There are other assumptions too:

- The programme assumes that many school ground environments are so hostile to invertebrate life that it can be very hard to find invertebrate even if teachers were to take pupils out into the school grounds. The programme assumes also that children come from home environments that may be equally hostile to invertebrate life.
- Working in small groups as they do during fieldwork activities will develop pupils' social competency skills
- When pupils see living things in the environment they react to them, relate to them and in some cases cease to be afraid of them. This will open up new avenues of interest to them and some will build on this interest in the future.
- If topics include outdoor exercises pupils get an opportunity to look at the environment and see the impact, both beneficial and detrimental, that people have on the environment.
- Pupils enjoy the experience of being outdoors.
- Experiential learning adds value to classroom activities with respect to pupils' experiences, awareness, knowledge and appreciation of the plant and animal world around them.
- Many teachers have little fieldwork experience and lack specialist knowledge of the environment.
- If teachers take part in this programme they have the opportunity to learn more about animals, plants and the environment.
- Teachers' increased knowledge about the environment will increase their confidence about leading the same or similar fieldwork activities.

- If teachers have confidence in leading outdoor activities then they may take pupils out of doors as opportunities and resources allow.
- In the future, circumstances may enable teachers to play a stronger role in the delivery of these outdoor learning experiences.
- When pupils tell their parents about their outdoor experiences, the parents may be motivated to take their children back to the same place or to other similar places.

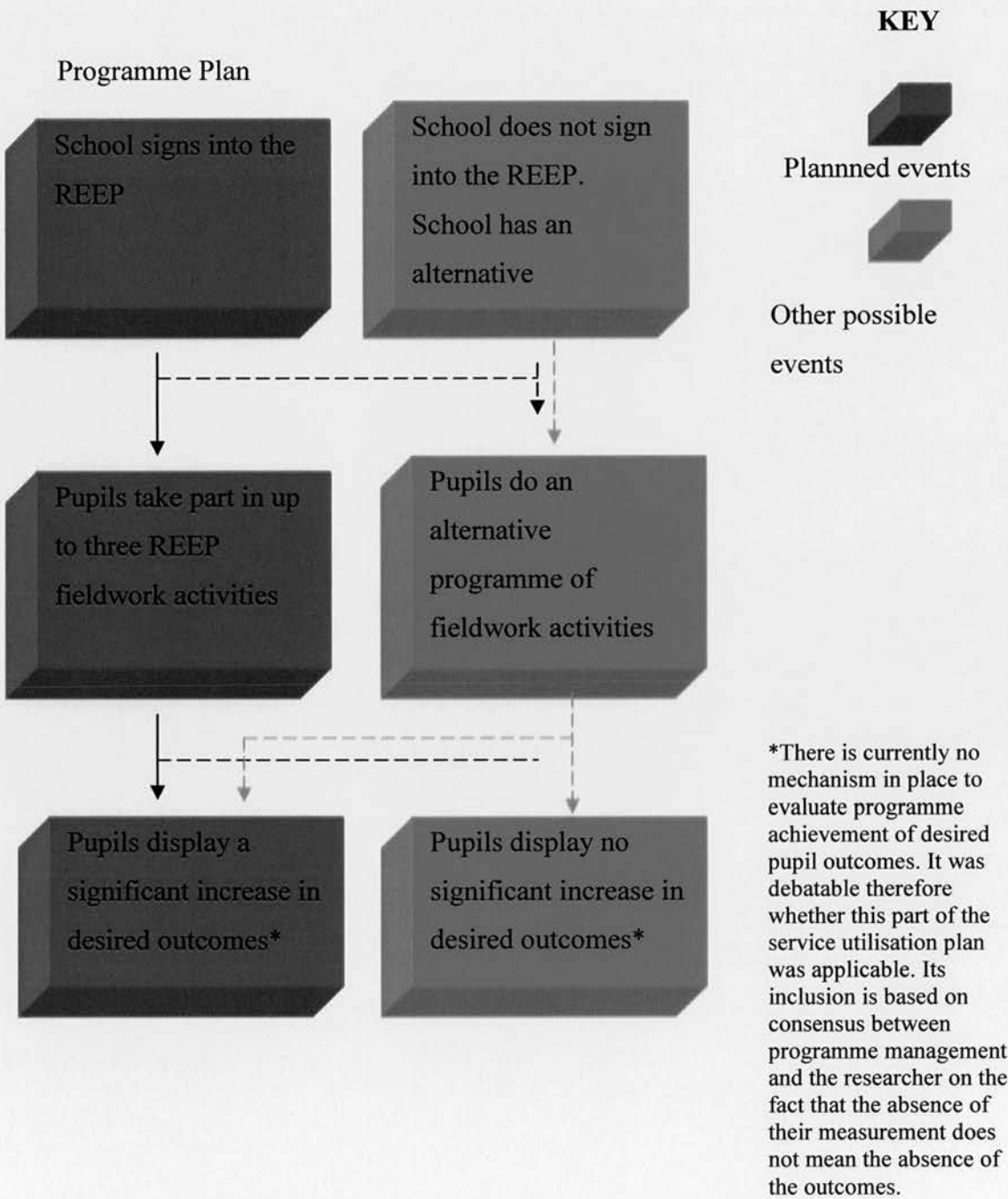
Process Theory

Process theory is constituted by the assumptions and expectations on which programme process is based. Programme process is made up of a programme's organisation and the service delivery system that supports the programme. Below is a drawing of REEP's service utilisation plan.

The Service Utilisation Plan for the Renfrewshire Council Primary 5 'Environmental Education Programme'

The service utilisation plan is depicted as a flowchart that tracks the various paths that programme targets can follow from some point prior to contact with the programme through to a point when there is no longer any contact (Rossi, Lipsey & Freeman, 2004, p. 142). Such charts are useful for identifying the possible situations in which a programme's target population is not engaged with the programme as intended. For the REEP this is when schools opt-out of participation in the programme, which is the school's prerogative. Another instance is when pupils within registered schools do not take part in the programme, obviously firstly because they are not in a Primary 5 or related composite class, or if they are in such a class, their parents opt-out of having their child participate in the field trip that constitutes the main event in the programme.

Figure 3.6 Service Utilisation Plan for the Renfrewshire Council Primary 5 Environmental Education Programme



The Organisational Plan for the Renfrewshire Council Primary 5 'Environmental Education Programme'

The first element of a programme's organisational plan is a description of its objectives for the services it will provide; then what those services are, how much will be provided, to whom and on what schedule. The next element is a description of the resources and functions necessary to engage in those service activities (Rossi, Lipsey & Freeman, 2004).

Renfrewshire Council Primary 5 'Environmental Education Programme' goals and objectives

These are outlined in the first row of Table 3.1.

The services that the Renfrewshire Council Primary 5 'Environmental Education Programme' will provide

Once a year the programme will take P4/P5 classes (including some P6 composite classes) of Renfrewshire Council primary schools through up to three outdoor fieldwork activities. These activities are 'freshwater minibeasts', 'woodland minibeasts' and 'habitat mapping'. Depending on the location of the school, there is a choice of 12 possible venues for these fieldwork activities. The venues are a choice of country parks, nature reserves, town parks etc. Some venues do not have the facilities to enable all three activities to be done during one full day session. Venue limitations include the fact that some venues do not have visitor centre facilities and some do not have a pond. If a venue allows less than all three activities to be done then a half-day session is arranged. Some of the rural schools have school grounds where the fieldwork could actually be done within the school grounds, while some schools are within short walking distances of venues. The programme managers are always on the lookout for new venues that can be developed near each school. The reasons have to do with the issue of sustainability. Walking to a venue instead of using a bus is in keeping with environmental sustainability. It is also cheaper for the school. The fact that it is near the school will encourage future use for the same and similar activities by the school. This is good for the sustainability of the EE programme and fits in with other agendas such as healthy lifestyles, encouraging young people to know their local area, and so on. Combinations of providers/staff facilitate the REEP, for example the outdoor education development officer working with park rangers, or with the private outdoor education service provider Starling Learning, or Starling Learning staff on their own, or park rangers on their own, or

park rangers working the outdoor education development officer, or park ranger working with Starling Learning.

A team of personnel representing Renfrewshire Council, primary schools, countryside parks, RSPB and Starling Learning manage and oversee the programme. They meet three or four times a year between September and March to review the programme and plan future developments.

Resources and prior functions

Because the programme is classified as quite high priority, the council has a separate budget specifically to fund the fieldwork activities. Three staff members at Renfrewshire Council work directly with the programme, an Education Advisor who line-manages the Outdoor Education Development Officer and a Primary School Teacher on secondment and who holds the post of Staff Tutor – 5-14 Science. Between them, the staff at Renfrewshire council bring to the programme expertise as well as experience in programme management, outdoor education, biology, secondary school education, primary school education, and materials development. Administration staff at Renfrewshire Council provides clerical assistance for the programme. Clerical support is required for photocopying, checking on school travel logistics and other communication with the schools, typing and information management (filing). The council provides master copies of the worksheets to be used during the fieldwork exercise in each of the different venues and delivers these to the schools with the assistance of countryside rangers. The programme buys in an external service provider (Starling Learning), and manages services provided by countryside rangers. The programme provides all equipment used during fieldwork activities as well as waterproof clothing for those children who may come inadequately dressed.

Towards the end of the first term of the school year the Outdoor Education Development Officer who supervises the programme acquires details from the council headquarters of the number of classes in the year groups the programme is concerned with. With the information about how many classes each school has, he then allocates each school a date for the outdoor activity. Initially it was possible to offer each school a choice of dates. With the growth of the programme this is no longer possible. So the Development Officer now draws up a programme allocating

each school particular dates. If the dates allocated do not suit, the school contacts him to request a switch of dates.

A few schools do the programme during the August to October period of the year. Most of the schools however prefer to do the activities between Easter and the end of term (July).

GENERAL USES OF PROGRAMME THEORY

The results presented for the Renfrewshire case study beg questions on the possible uses of programme theory to the practitioner (teachers and EE programme managers), the researcher and the evaluator (in the present study I am a researcher and evaluator).

Programme theory provides a description of the programme as it exists and an understanding of the programme issues that really matter to the parties involved. One common outcome is that it highlights to programme managers and sponsors aspects of the programme that need modification. The description of programme theory for the REEP has highlighted to management the lack of systematic evaluation of programme success in meeting its goals and objectives. This came through their reading of the report and discussions during the iteration process. A teacher evaluation questionnaire is administered after each fieldwork activity day. This assesses the extent to which the day's activities meet the teacher's expectations, how the teacher will take the day's activities forward, how appropriate the equipment and facilities were for the pupils, any suggestions for changes in the content or presentation of the programme, suggestions on follow up that would be helpful, and how confident the teacher would feel about leading the activities given all the necessary resources. All these are very pertinent questions, which however do not evaluate the programmes primary goals and objectives. The programme's impact assessment further reveals a need for programme managers to look at the holistic provision of EE to programme participants in their schools. This would contextualise the input of the REEP and locate any gaps in overall provision. This in turn would inform further review and development of the programme.

Depicting the theory explicitly often brings to the surface assumptions and expectations inherent in the programme that do not seem very plausible to

programme personnel when laid out in writing. This reaction may motivate programme personnel and other stakeholders to pursue changes in programme design. When this results from their involvement in the process of describing programme theory, or from insights gained when the results of that process are reviewed, it demonstrates the utility of programme theory description. Stakeholder agreement on the theory description serves only to confirm that the description does, in fact, represent their understanding of how the programme is supposed to work. It does not necessarily mean that the theory is a good one. To determine the soundness of a programme theory it must not only be described well but also evaluated carefully (Rossi et al. 1999). Smith (1989) cites Patton (1986) who states that evaluation of the programme theory drawn will not lead to final statements about causal linkages, but will reduce uncertainty about them.

The reasonable estimations of causality that are represented by programme theories, although often found problematic by hard-line academics and scientists, are understood and appreciated by policy-makers and programme decision-makers. (Patton, 1997, p. 217). Attention to programme theory can yield important insights that would otherwise elude the reader of a descriptive presentation of the programme.

I would like to suggest that another use of programme theory could be as part of a Realistic Effectiveness Cycle (Pawson & Tilley, 1997; Kazi, 2003). Programme theory would provide the propositions on how the mechanisms introduced by a programme into pre-existing contexts can generate outcomes. This would be followed, according to the realistic effectiveness cycle, by hypotheses that typically address questions like ‘what contexts impinge on a programme’s ability to bring about change and meet its objectives?’ ‘What social, cultural and other mechanisms in the pre-existing environment would enable these changes, and which ones may disable the programme?’ The next step would be the selection of appropriate methods of data collection according to identified evaluation research methods that can address the questions raised by the theory and the hypotheses, and that can provide data on the theoretical assumptions, the identified mechanisms, and the identified outcomes of the programme (Kazi, 2003).

DISCUSSION AND LESSONS LEARNT FROM THE RENFREWSHIRE COUNCIL PRIMARY 5 'ENVIRONMENTAL EDUCATION PROGRAMME' CASE STUDY

The reference to literature (Hungerford & Volk, 1990) in completing the second part of the impact theory echoes the words of Hurrell et al. (2003) who identify literature as helpful in identifying plausible causal links during the construction of programme theory.

I did not have the opportunity to interview teachers involved in the programme. However one of the programme managers is a primary school teacher on secondment. She gave information that went some way in informing the present study of the teachers' perceptions about this programme.

The results presented above represent programme management, fieldwork tutors and to a lesser extent, outdoor centres' story of the REEP and its provision of EE to Renfrewshire primary school pupils. It is not the pupils' story. It is not the teachers' story and it is not the schools' story of the REEP, neither is it the story of EE and ESD in the schools as a whole. This is bearing in mind that other voluntary organisations, e.g., Keep Scotland Beautiful's Eco Schools programme (see p.124), are at work in the same schools. Further, there are classroom based EE curriculum activities taking place. To obtain a complete picture for EE provision to these pupils, it is important that all these stories be told and a model drawn, not just for the REEP but also for EE in Renfrewshire primary schools. At the end of the day the product of schooling will represent the additive effects of all efforts. It is this holistic story that is important and is the true EE programme theory for Renfrewshire primary schools. These results lead me to the conclusion that EE in Scotland is best studied *in situ*, looking at examples of schools selected using some criteria.

The decision to study two schools in Scotland and two in Zimbabwe was made as a result of several considerations. Initially I considered using just one case study school in each country. I considered this too limiting, especially in the Scottish context where the 5-14 primary school curriculum extends from the first seven years of primary school to the first two years of secondary school. The possibility of studying more than two schools in each country was out of the question because the rigour of research methods to be used within each school meant that the time and resources available for this PhD research programme would not allow it. Programme

theory however requires a *boundedness* (Rossi et al, 2004, p. 146) in the programmes studied that mean that case studies of schools would be nested (Patton, 2002, p. 447) in that individual EE programmes within those schools will constitute cases and will be the unit of analysis. These issues are defined and discussed further in the second part of this chapter during the discussion of the use of case study as a research strategy.

The results of this research will test the limits of the applicability of programme theory by attempting to use it to describe the summative efforts of more than one programme within the same context.

One needs to know little about research to appreciate the elusiveness of definitive conclusions about causality (Patton, 1997, p. 217). Patton identifies three approaches to programme theory development: the *deductive approach* draws on scholarly theories from the academic literature, the *inductive approach* involves doing fieldwork on a programme to generate grounded theory, and the *user-focused approach* involves working with intended users to extract and specify their implicit theory-of-action (p. 219). This research will use an inductive as well as user-focused approach to generate a grounded theory of the practitioner's implicit theory of action. A grounded theory is one that is a result of methods that take the researcher into and close to the real world so that the results and findings are grounded in the empirical world (Patton, 1997, p. 125). Cause and effect relationships represented in programme theory require a temporal sequencing of the components and objectives in a programme. The resulting means end hierarchies are quite modestly reasonable estimations of the likelihood that particular activities have contributed in concrete ways to observed effects – emphasis on the word *reasonable* (Patton, 1997, p. 217). In earlier work Patton cited in Smith (1989) issues a caution on the use of temporal sequencing.

Once a programme is in operation, the relationships between links in the causal hierarchy are likely to be recursive rather than unidirectional. The implementation and attainment of higher-level objectives interact with the implementation and attainment of lower-order objectives through feedback mechanisms, interactive configurations, and cybernetic systems. Programme components may be conceptually distinct in the formal version of a theory of action, but in practice these analytically distinct components, links and stages are highly interdependent and dynamically interrelated. In short, the cause-effect relationships may be mutual, multidirectional, and multilateral.

(Patton, 1986, p. 164)

In light of the number of EE programmes to be investigated in the main study the issue of readability of programme theory presentation is a serious consideration in this research. Smith (1989) recommends that initially researchers use whatever format they feel comfortable with and which helps them understand what the programme is about. Later on two other criteria become important: (1) communication clarity and ease with stakeholders, and (2) ease of analysis among the different programme parts (p. 53). With these considerations in mind Linear Logic Models will be drawn for all EE programmes to be investigated, and these will be delineated into Impact Theories and selected aspects of the Process Theory. For clarity complete Linear Logic Models for individual programmes will be situated in Appendix III - VI and the Impact Theories and Process Theory will remain in the main text of the thesis. Aspects of the Process Theory that will not be described for EE programmes in the main study are the Service Utilisation Plans and the Action and Conceptual Hypotheses. The description of these would be time and resource intensive and outside the capacity of my study.

To aid the readability of the Impact Theories in the main study boxes representing particular activities and outcomes will be coloured or otherwise shaded distinctively and a 'Key' provided to highlight the type of activity or outcome they represent. Arrows linking to outcomes that are speculative and outside the control of the school will also be specifically identified.

METHODOLOGY AND RESEARCH DESIGN: PART 2

INTRODUCTION

The present study takes a qualitative, inductive approach to an in-depth analysis of EE in four case study schools, two in Scotland, and two in Zimbabwe. Programme theory is used as a lens that provides a predetermined framework for data collection and analysis within the cases. The grounded programme theories that emerge as a result are used as the foundation for contrast within and between the two countries. At the end of the study I will make socially constructed knowledge claims (Creswell, 2003, p. 8) and assertions or propositional generalisations (Stake, 1995 In Creswell, 2003, p. 133) regarding the impact of EE and the contextual influences that mitigate this impact.

Denzin and Lincoln (1994) define qualitative research:

Qualitative research is multimethod in focus, involving an interpretive, naturalistic approach to its subject matter. This means that qualitative researchers study things in their naturalistic setting, attempting to make sense of or interpret phenomena in terms of the meaning people bring to them. Qualitative research involves the studied use and collection of a variety of empirical materials – case study, personal experience, introspective, life story, interview, observational, historical, interactional, and visual texts – that describe routine and problematic moments and meaning in individuals' lives (p. 2).

This definition suggests an *a priori* approach grounded in philosophical assumptions – the “interpretive, naturalistic approach” – to qualitative research (Creswell, 1998, p. 15). In education qualitative research is often called *naturalistic* because the researcher ‘hangs around’ where the events of interest are naturally occurring, making no attempt to manipulate the phenomenon of interest (Bogdan & Bicklen, 1982, p. 3; Patton, 2002, p. 39).

The use of qualitative inquiry was selected because the study sought to describe the nature of EE in the two countries, initially through studying general processes taking place nationwide, and then detailed case-by-case study of four schools. According to Creswell (1998, p. 17) besides having a research question which begins with *how* or *what*, a second reason for selecting a qualitative study must be because the topic needs to be explored. Studying EE programmes *in situ* will require an exploratory study of individual programmes, learners and personnel in their *natural setting*.

According to Creswell (1998) this involves going out to the setting or field of study, gaining access, and gathering material. If participants are removed from their setting, it leads to contrived findings that are out of context (p. 17). For this research the result should be a detailed view on the subject of EE in the primary curriculum and the contextual factors that aid and constrain good practice.

The qualitative approach taken emphasises my role as an active learner who at the end of the day tells the story from the participants' view rather than an expert who passes judgement on participants (Creswell, 1998, p. 18).

THE QUALITATIVE RESEARCH PARADIGM

Qualitative inquiry entails immersion in the everyday life of the setting chosen for the study. The researcher enters the informant's world through ongoing interaction and seeks the informants' perspectives and meanings (Marshall & Rossman, 1989, In Creswell, 2003, p. 198).

Qualitative research is distinctive from other research methodologies in that it possesses several unique characteristics. The following are commonly articulated characteristics of this research paradigm.

- Qualitative research takes place in the natural setting of the entity for which study is proposed. This is because naturalistic ontology suggests that realities are wholes that cannot be understood in isolation from their contexts; because of the belief that context is crucial in deciding whether or not a finding may have meaning in some other context as well; and because contextual value structures are at least partly determinative of what will be found (Creswell, 2003, p. 181; Guba & Lincoln, 1985, p. 39).
- Qualitative research uses multiple methods that are interactive and humanistic. This generates multiple forms of data, and with each the researcher gathers as much information as possible to collect detailed accounts for the final research report. Actual methods of data collection are traditionally based on open-ended observations, interviews and documents. The data collected include text and images (Creswell, 2003, p. 181; Creswell, 2005, p. 48).

- Qualitative research design may be emergent and lead to grounded theory (see the Discussion and lessons learnt from the Renfrewshire Council Primary 5 'Environmental Education Programme' case study on p.79). Meanings and interpretations are negotiated with human data sources because it is the participants' realities that the researcher seeks to 'construct'. The research questions may change and be refined as the enquirer learns what to ask. The general pattern of understanding will emerge as it begins with initial codes, develops into broad themes, and coalesces into a grounded theory or broad interpretation (Creswell, 2003, p. 181; Guba and Lincoln, 1985, p. 41).
- Qualitative research is fundamentally interpretive. This means that the researcher makes an interpretation of the data. It includes developing a description of a setting or individual, analysing the data for themes and categories, and finally making an interpretation or drawing conclusions about its meaning personally and theoretically, stating lessons learnt or further questions to be asked. This process of interpretation is value-laden (Creswell, 2003, p. 182).
- Qualitative research studies appear as broad, panoramic views, rather than micro-analyses. This is because the qualitative researcher views social phenomena holistically. The more complex, interactive, and encompassing the narrative, the better the qualitative study (Creswell, 2003, p. 182).
- Relatively little standardised instrumentation is used at the outset. The researcher is the primary instrument of data collection. (Creswell, 2003, p. 198; Guba and Lincoln, 1985, p. 39; Miles and Huberman, 1994, p. 7).
- The qualitative researcher uses complex reasoning that is iterative and largely inductive. The inductive process is preferred because it is more likely to identify the multiple realities to be found in qualitative data, the mutually shaping influences that interact, and also allows values to be an explicit part of the analytical structure (Creswell, 2003, p. 182; Guba & Lincoln, 1985, p. 40).
- Qualitative research relies on the utilisation of tacit knowledge (intuitive or felt knowledge) in addition to propositional knowledge (knowledge expressed in language form) because often the nuances of the multiple realities can be

appreciated only in this way (Creswell, 2003, p. 199; Guba & Lincoln, 1985, p.40).

- The data that emerge from qualitative research are often descriptive, reported in primarily the participants' words, or pictures, rather than in numbers. Further this research tradition is more likely to prefer the case study reporting mode over the scientific or technical report because it is more adapted to a description of the multiple realities encountered at any given site, demonstrating the investigator's interaction with the site; providing a basis for individual 'naturalistic generalisations' (Stake, 2000, p. 22) and transferability to other sites (thick description), as well as clarifying the contextual factors (Guba & Lincoln, 1985, p.40; Creswell, 2003, p.199;).
- Qualitative research favours purposive or theoretical sampling as this can be pursued to maximise the researcher's ability to devise contextualised grounded theory (Guba & Lincoln, 1985, p. 40).
- This research tradition utilises idiographic interpretations. This means that data are interpreted in terms of the particulars of a case rather than in terms of law-like generalisations (Guba & Lincoln, 1985, p. 42).
- The qualitative researcher is likely to be tentative about making broad application of the findings because realities are multiple and different; and to an extent depend on the interaction between the investigator and the respondent that may not be replicated elsewhere; also contextual factors, including values, may be sharply at variance from site to site (Guba & Lincoln, 1985, p.42).
- The conventional trustworthiness criteria of internal and external validity, reliability and objectivity are inconsistent with the characteristics of qualitative research. There exist substitute criteria (such as credibility, transferability, dependability, and confirmability) as well as empirical procedures for confirming trustworthiness of qualitative approaches (Guba & Lincoln, 1985, p. 43).

The qualitative research strategy used in this study is the case study.

Case study

A case study is an exploration of a “bounded system”, or a case (or multiple cases) over time through detailed, in-depth data collection involving multiple sources of information rich in context. This *bounded system* is bounded by time and place, and it is the *case* being studied – a programme, an event, an activity, or individuals (Creswell, 1998, p. 61).

A brief history of case study

The history of case studies as a method of sociological research is difficult to trace because the term ‘case study’ is not used in a standard way. In some of its uses the meaning of the term overlaps with that of the use of the terms, *ethnography*, *participant observation*, *fieldwork*, *qualitative research*, and *life history* (Bogdan & Biklen, 1982, p. 3; Stake, 1985, p. 236; Hammersley & Gomm, 2000, p. 1). Further the notion of case study is related to practical fields such as law, medicine and social work, whose practitioners all deal with *cases*. Consequently the case method has featured much in professional education and the training of managers. Historically the origin of the idea of case study seems to have had a lot to do with the social worker’s “case history” or “case work” (Platt, 1981, p.19). The data from social work case records were used in some early studies that have come to be treated as classics of case study inquiry, such as Thomas and Znaniecki’s *The Polish Peasant in Europe and America (1918-20)* (Bogdan & Biklen, 1982, p. 3; Hammersley & Gomm, 2000, p. 1). It seems likely therefore that case study *research* arose out of, or was strongly influenced by case study approaches in other fields. It probably stems from this history that some writers claim that case study is not a methodological choice, but a choice of object to be studied (Stake, 1985, p. 236). Some commentators treat case study as a method, to be used as and when appropriate (Yin, 1994, p. 13; Hammersley & Gomm, 2000, p. 3), while still others regard it as a distinct research paradigm (Simmons, 1996). At the extreme, case study is viewed as more akin to the portrayal of the social world by novelists, short story writers and poets (Hammersley & Gomm, 2000, p. 5). Hammersley and Gomm (2000, pp. 5-6) discuss the methodological issues arising from these differences. According to Patton (2002) the case study approach to qualitative analysis constitutes a specific way of collecting, organising, and analysing data. It thus represents an analytic *process*. This analytic process, in turn, results in a product - a *case study*. The term *case study* can thus refer

to either the process of analysis or the product of analysis or both (Patton, 2002, p. 447). It is the later that the term refers to in the present study.

Applications of case study

A case may be simple or complex. It may be a single individual, several individuals separately, or in a group. It may be a programme, events or activities. A case may represent a process consisting of a series of steps that form a sequence of activities (Stake, 1985, p. 236; Creswell, 2005, p. 439). However, not everything is a case. Stake (1985) gives the example of it being possible for a doctor to be a case, a child may be a case, but the doctor's *doctoring* lacks the specificity and *boundedness* to be a case. Reasons and policies for dealing with issues in general are seldom considered to be cases. They are generalities, rather than specifics. The case is a 'functioning specific' (p. 236).

Three types of case studies may be identified from the purposes for which researchers study cases. In the *intrinsic case study*, the case is selected because it has interest in and of itself. It is not undertaken because it represents other cases or because it illustrates a particular trait or problem. The purpose is not to understand some abstract construct or generic phenomenon, or to build theory – though this may be one of the outcomes (Stake, 1985, p. 236).

In an *instrumental case study* the focus may be a specific issue, with the case used to illustrate the issue (Creswell, 2005, p. 439). The case may also be used for refinement of theory. The case is of secondary interest, playing a supportive role in facilitating understanding of something else (Stake, 1985, p. 237). It involves an in-depth analysis that includes a scrutiny of context and detailing of ordinary activities. The case may be seen as typical or atypical, but either way is expected to facilitate understanding of the issue of interest.

In the *collective case study* multiple cases are described and compared to provide insight into a particular issue (Stake, 1985, p. 237; Creswell, 2005, p. 439). It is an instrumental study extended to several cases. In the present study a collective case study was carried out. The issue of interest was the understanding of EE in practice in the four schools and these cases represented perceived examples of good practice.

In a review of research methods in EE research in the 1990s Hart and Nolan (1999) cite the work of Iozzi (1981) who found that 90% of research reported in EE during the 1970s employed quantitative methods. This did not change in the 1980s as indicated by Marcincowski (1990). In the 1990s conferences by the North American Association for Environmental Education were at the forefront of discussions about the need to broaden conceptions of research beyond applied science designs. These have seen a shift within the last decade towards the inclusion of interpretive, critical and post-modern lines of inquiry within EE research literature (Hart & Nolan, 1999). Qualitative methods used have included ethnographic methods, discourse analysis, hermeneutic phenomenology, interviews, observations, 'think aloud' sessions and narrative enquiry. This trend towards qualitative methods and methodologies in EE research are manifest in action research, case study research, and descriptive research highlighting curriculum issues, context issues, community awareness and action, as well as evaluation research.

Hart and Nolan (1999) found that the use of case study in EE research was focused in one of three areas: curriculum practice and reform, political and economic context issues in EE, and community environmental awareness and action. A significant portion of research into curriculum practice and reform remain at the stage of finding out how and if EE is incorporated into the primary and secondary school curricula. These studies identify several barriers to EE. A few case studies have been conducted on the development and implementation of action-oriented EE curriculum materials and experiences. Each of these case studies focused on determining how environmental action strategies in the curriculum will affect students' and teachers' attitudes to and concerns with learning about the environment. A number of case studies have used principles of action research methodologies. In the arena of case studies of contexts Fien (1992) studied macrocontexts in the teaching of EE in Queensland. Fien's work explores all macrocontexts including global issues, local issues of political, economic, and social significance, and curricular issues within the education system. Other EE case studies reported however explored the relationship with economic issues, and others the relationship with political influences on curriculum change and policy development. One of the two case studies in this arena looked at Japan while the other looked at Australia. The last group of case studies reviewed by Hart and Nolan (1999) look at community awareness and action. The

studies reported for this cluster of research concentrate on community-based EE programmes.

Why the case study strategy is appropriate for this research

Yin (1994) identifies the case study as having a distinct advantage when ‘how’ and ‘why’ questions are being asked about a contemporary set of events over which the researcher has little or no control. Case study research strategy is also suitable for ‘what’ questions that are exploratory (Yin, 1994, p. 5). Exploratory ‘what’ questions constitute the last three research questions in the present study.

I sought answers related to the nature of EE in the formal curriculum in two countries, as exemplified by case study schools. Revealing the nature of EE within the school context required in-depth analysis of contemporary activities happening within a school situation. Whilst each school is unique and set within a context, schools within a country follow more or less standardised national curricula, set within a national cultural, social, economic and political context. The variable success with which schools teach EE points to a research approach that studies the process in context to delineate contextual realities that impinge on what is otherwise a standard curriculum within each country context. According to Yin (1994), a case study investigates a contemporary phenomenon within a real life context (p. 13). Only a case study would produce the in-depth understanding that this research sought and this meant that only a few cases could be studied within the time, financial and personnel constraints of a three-year PhD study. My study also sought to locate the case study schools within their country contexts according to predetermined themes. These were policy, partnerships, programmes and values (See Methodology and Research Design: Part 1, p.51).

The Renfrewshire Primary 5 Environmental Education Programme revealed that often more than one EE programme is taking place within a given school in Scotland. Further, there are activities within the curriculum that have a specific EE message. The story of EE provision in a school must therefore be the sum of all efforts. A study of EE provision in a school context therefore called for a case study research approach in selected individual schools.

The choice of a multiple case study approach was to increase insight on the issue and illustrate alternative approaches, highlighting too the role of context in decision-making regarding EE programmes.

The method used for selecting the case study, which will be detailed later, selected cases that were examples of ‘good practice’. This *a priori* evaluation was by authoritative figures in the field from within each national context. One of the aims of this research was to describe this ‘good practice’ within its context. Because of the scale of the study, spanning two continents and possibly cases that were hundreds of kilometres apart within those continents; bearing also in mind the research context, which would be the living, functioning school, it was important to me as the investigator, and to my expected participants (from knowledge gleaned from previous experience of working with them), for me to have an efficient entry, working and exit plan before entering the schools. This I would make explicit to the headteacher of the school before the visit or on entry. The headteacher of the school would in turn explain the plan to selected teachers in the school either before I visited or as soon as possible thereafter. The need to cause as little disruption to school functioning as possible, and thereby to increase rapport with and cooperation from participating schools and their staff (Creswell, 2003, p. 181), encouraged me to search for a detailed plan of investigation at each case study site. The promise of exactly this is what made programme theory, or theories of action (Smith, 1989; Rossi et al, 2004; Patton, 1997) very attractive. The exploratory ‘what’ questions (outlined later in this section) that constitute the first two research questions of this study lend themselves well to the use of programme theory (Yin, 1994, p. 118). According to Yin, case study analysis provides empirical data for a programme logic model.

The earliest attempt to systematically describe programme theory arose from the experiences of an evaluation research group at the Urban Institute in Washington, DC in the 1970s (Wholey, 1979). They found it difficult, and indeed often impossible, to undertake evaluations of public programmes. They began to analyse the obstacles. They came to the conclusion that a qualitative assessment of whether minimal preconditions for evaluation were met should precede most evaluation efforts. They called this *evaluability assessment* (Rossi et al, 2004, p. 136). This research borrows from the first stage of this three-stage process – the description of

the programme's theory. Programme theory is the programme's plan of operation, the logic that connects its activities to the intended outcomes, and the rationale of why it does what it does (Rossi et al, 2004, p. 44). They further state that in this process investigators operate much like ethnographers, in that they seek to describe and understand the programme through interviews and observations that reveal its social reality from the perspective of programme personnel and significant stakeholders (p. 136). It also involves a study of official documents, and information regarding the programme. The intended result is a description of the programme in reality and an understanding of the programme issues that really matter to the parties involved. While acknowledging that the process requires the judgement and discretion on the part of investigators, various practitioners have attempted to codify the procedure for carrying out evaluability assessments (see Smith, 1989, Rossi et al, 2004). For me such a codified procedure was ideal for drawing up a participant selection, entry, working and exit plan for this research within selected schools, resulting in a description of EE as it existed in reality in the selected schools.

The use of programme theory guided the way the cases are investigated and described. In this, programme theory acts much like a *theoretical lens* or *perspective* of the type that is increasingly used by qualitative researchers to guide their study and raise questions they would like to address (Creswell, 2003, p.10 and p.131). Such theoretical perspectives provide a means to guide researchers as to what issues are important to examine, who should be the respondents, how the researcher positions him-/ or herself in the qualitative study, and how the final accounts should be written. The product (programme theory) is not, however, an example of the global conceptual schemes of the grand theorists, nor does it rest exclusively in the proven social science theoretical schema. What is advocated is microtheory – a description of the structural and operational characteristics of a programme (Smith, 1987, p. 51). In the present study an inductive approach – involving doing fieldwork on the programme to generate grounded theory (Patton, 1997, p. 219) is used. The use of programme theory as a theoretical framework is reflected in research question two and three of the present study (see p.92).

The use of this strategy not only shapes questions asked, but also the form of data collection and the steps of data analysis (Yin, 1994). According to Yin, the analysis of case study data is one of the least developed and most difficult aspects of doing

case studies. Investigations where investigators begin case studies without an idea of how the evidence is to be analysed easily become stalled at the analytic stage. He suggests that it is important to have a general analytic strategy in place before going out to collect the data (p. 103).

The research questions

This study sought to answer the following research questions:

1. How do contextual factors shape the projected and real impacts of environmental education in the mainstream school curriculum in Scotland and Zimbabwe?
2. What is the nature of environmental education in Scotland, as exemplified by the case study of two schools identified as displaying 'good practice'?
3. What is the nature of environmental education in Zimbabwe, as exemplified by the case study of two schools identified as displaying 'good practice'?
4. What does the contrast between the two countries reveal about the factors that aid and constrain the development of environmental citizenship behaviour in the school context?

Question two and three in effect involve programme theory description of EE in the four case study schools. This takes an inductive as well as user-focused approach (Patton, 1997, p. 219) involving the investigator in carrying out interviews with selected managers and teachers, observations of formal teaching and learning activities, documentary analysis, and studying audiovisual information on the programmes. The results are empirically derived, theoretical models of the relationship between EE programme activities and outcomes, framed within important contextual factors.

This use of the case study in explaining the causal links in real life interventions that are too complex for survey or experimental strategies is identified by Yin (1994) as the most important application of case study in evaluation research (p. 15).

Defining the cases

This research consists of three layers of case studies. The case studies are layered or nested (Patton, 2002, p. 447), i.e., the research is a study of EE in Zimbabwe and Scotland. These represent two national case studies. Within each of these, two schools were selected as case studies exemplifying good practice. Within each school individual EE programmes represent case studies. As much as is practical all activities taking place in each school related to EE were examined – within the framework of identifiable programme boundaries, which in some cases will be exemplar topics within the core-curriculum.

Selecting the cases

Purposeful sampling was used to select information-rich cases that manifest good practice in EE. Patton (2002) calls such sampling *intensity* sampling (p. 234). An intensity sample consists of information-rich cases that manifest the phenomenon of interest intensely (but not extremely). Schools selected in both countries are typical in many respects, but within a continuum of varying practice are judged as displaying ‘good practice’ by people whose experience in the field mean that they would be able to make such a judgment. The fact that selected schools are fairly typical and within that display good practice means that the results may be used illustrate the nature of success in a context that other schools are able to relate to and realistically emulate. The process by which these information-rich cases were selected is detailed below.

Scotland

Stage One

A postal survey was sent out to all 32 local authorities of Scotland (see Plate 1). The survey questionnaire was addressed to the Directors of Education who had the option to either complete it themselves or forward it to a person in charge of EE within their LEA. The purpose of the survey was to:

- establish contact with each local education authority (LEA);
- identify the person responsible for EE in the primary schools;
- discover other key informants;
- collect nationwide information on EE policy, partnerships, and programmes.

It is also a sampling tool, as this survey asks from each LEA a list of schools best reflecting the LEA’s policy in EE.

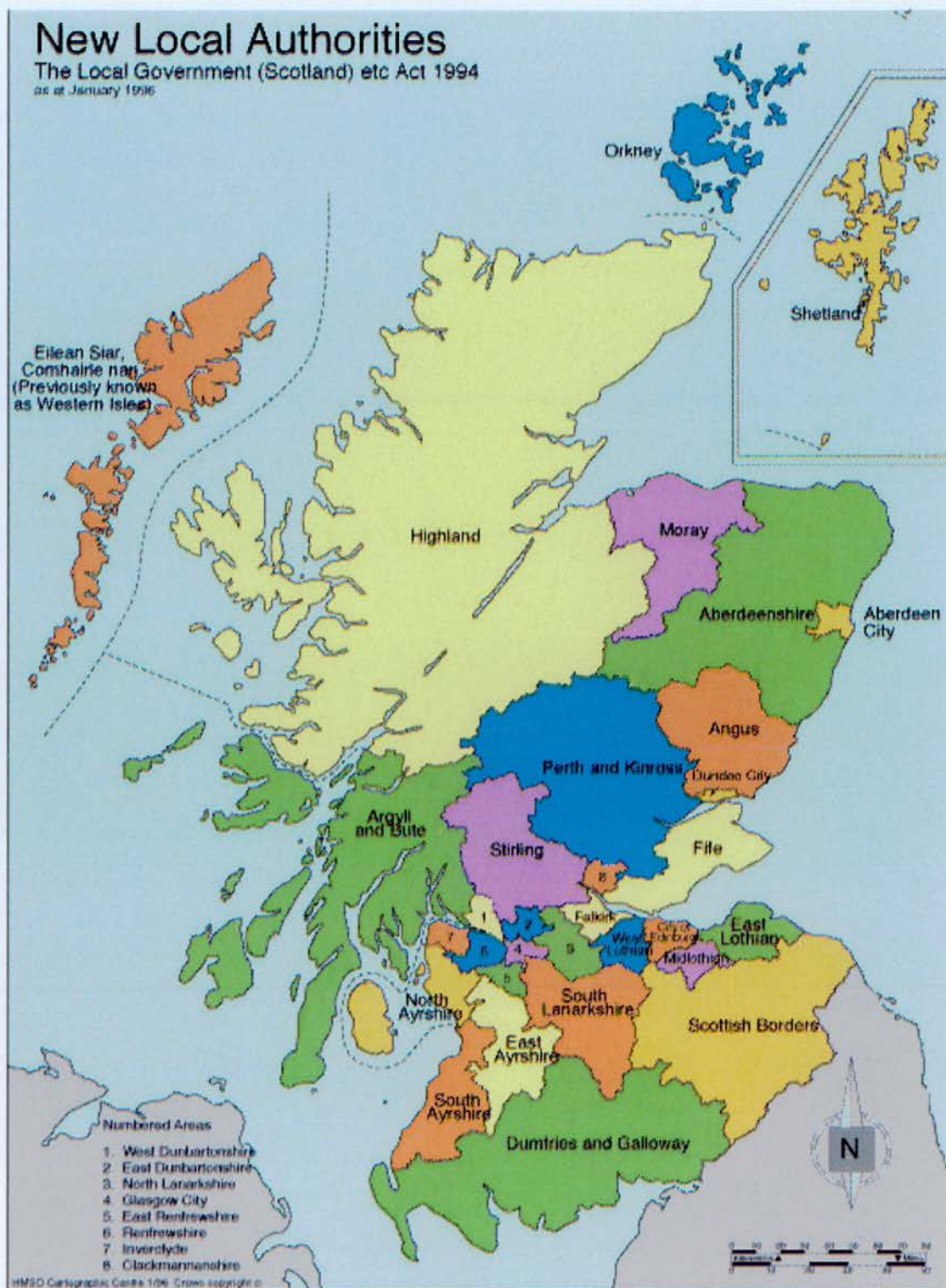


Plate 1 Map of Scottish Local Authorities.

Source: <http://www.scotland.gov.uk/library3/localgov/fs12-02.asp>. Accessed 27 January, 2006.

Local Education Authorities that responded to the Scottish national survey questionnaire are:

South Lanarkshire Council, West Dunbartonshire Council, Glasgow City Council, Dumfries and Galloway Council, Perth and Kinross Council, Argyll and Bute Council, Edinburgh City Council, Aberdeen City Council, Clackmannanshire Council, North Ayrshire Council, Shetland Island Council, East Lothian, Inverclyde Council, Falkirk Council, East Ayrshire Council, Scottish Borders Council, Angus Council, East Dunbartonshire Council, Comhairle nan Eilean Siar Council, Dundee City Council, North Lanarkshire Council.

The survey protocol requested categorical responses, and hence collected qualitative data (Yin, 1989, p. 14). The questionnaire contained closed and open-ended questions, and requested information on the nature of the local authority; information for use in identifying key informants and whether these would be willing to be interviewed face-to-face on the subject of EE within the 5-14 curriculum; the policy framework that guided the LA's EE activities; and the LA's partners in EE provision in its primary and secondary schools. The questionnaire also requested them to share any LA documents that give information about EE programmes within their LEA. This they could either attach to the completed questionnaire and post to me, or give to me during the face-to-face interview.

Twenty out of 32 (62.5%) postal survey questionnaires were completed and returned, with 15 LA key informants agreeing to a face-to-face follow-up interview. Six were actually interviewed. The face-to-face follow-up interviews were based on a general interview guide (Patton, 2002). This outlined the set of issues to be explored with each respondent. It served as a basic checklist during the interview to ensure that all relevant issues were covered (p. 342). An attempt was made to interview informants from different geographical areas representing the north, south and the central belt of Scotland.

Other informant interviews were carried out with representatives of voluntary organisations (RSPB, SNH, Eco Schools), headteachers (one, who at the interview was 'wearing two hats' as she was also representing her LA), Local Agenda 21 officers (one) and Her Majesty's Inspectorate of Education (HMIE) (one). Authoritative figures in the field were selected as respondents and interviews took place only with those who agreed to be interviewed. Except for the telephone interview, all interviews were tape-recorded, one-to-one and structured. They were also all based on the same general interview guide. The interview with an HMIE inspector was a brief telephone interview. This sought information about the criteria used to evaluate EE provision in schools during inspection. These key informant interviews were carried out between 5 March and 16 April, 2004. The purpose of these interviews was to add detail to the information gathered from the national survey. The interviews requested information regarding *EE policy*, *EE partnerships*, *EE programmes* and *EE values* (See p.54).

The advantage of an interview guide is that it helps ensure best use of limited interview time. It also helps make interviewing a number of different respondents on the same issues more systematic and comprehensive. It was also essential when informant interviews turned out to be focus group interviews of up to three people (Patton, 2002, p. 343).

Two schools in different local authorities were selected for in-depth analysis. The national survey was the basis for the selection of these schools. Of the total number of schools mentioned as examples of good practice during the national survey of LAs and key informant interviews, Inveraray Primary was mentioned the most often. Currie Community High School was mentioned the most often as a secondary school doing exemplary work. The selection of a primary and a high school in the Scottish context was to accommodate the entire 5-14 Curriculum for primary schooling in Scotland. This extends to the first two years of high school (Secondary 1 and Secondary 2). No doubt more schools than this will be doing excellent work and will be examples of various models of good practice, but time and resource constraints limited the scope of the project.

In-depth study of the first case study school took place from 26 April to 30 April, 2004. In-depth study of the second case study school took place from 7 to 14 May, 2004.

Zimbabwe

A postal survey questionnaire was sent out to all nine provincial education offices (Bulawayo and Matabeleland South were combined under one provincial education office, although this has now been changed) (See Plate 2). The purpose of the questionnaire was the same as for the Scottish Local Authorities though in the Zimbabwean situation initial contact was with the Provincial Education Director, who had the option of completing it themselves or forwarding it to the person in charge of EE within their province.

Seven of the nine (78%) postal survey questionnaires were completed and returned, with five LA key informants agreeing to a face-to-face follow-up interview. Four were actually interviewed. Again the purpose of these interviews was to add detail to the information gathered from the national survey.

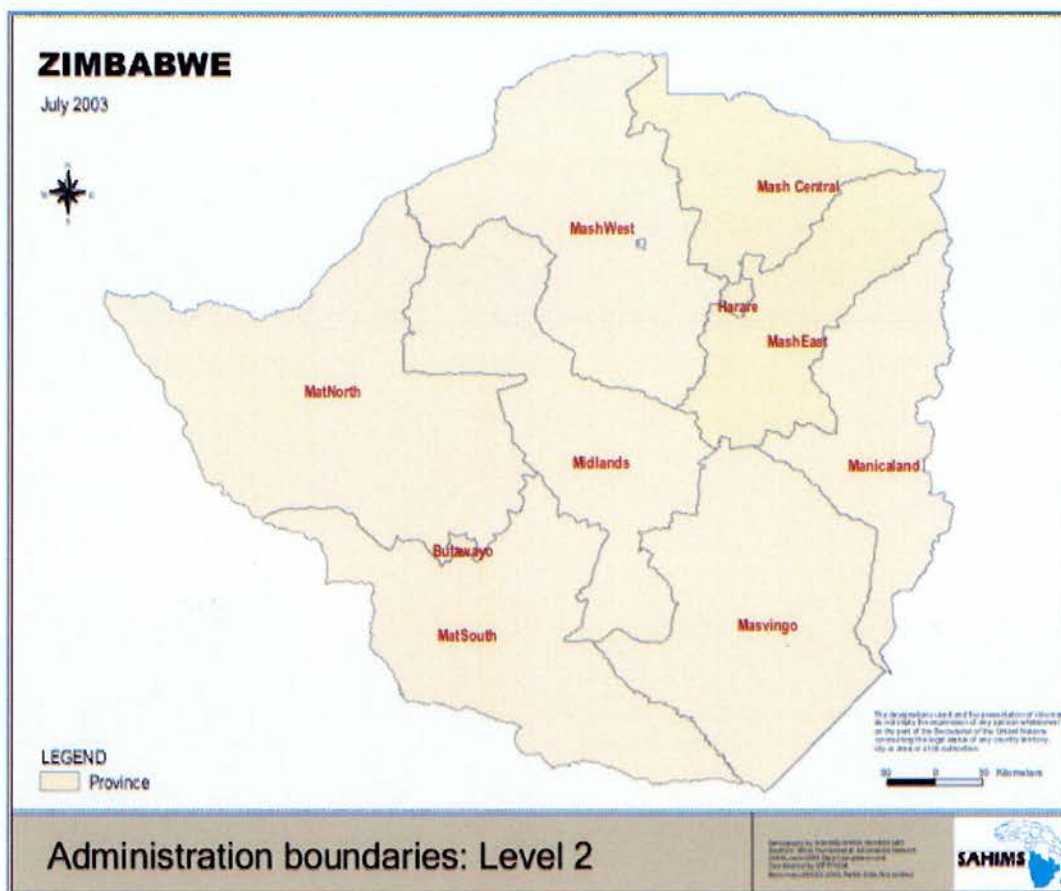


Plate 2 The 10 provinces of Zimbabwe.

Source: http://www.sahims.net/gis/Gis%20Input/zim_map_index.asp, Accessed 27 January, 2006.

Follow up key informant interviews of LA personnel were carried out during August and September 2004. Informants were either an Education Officer, Deputy Provincial Education Director, or Deputy Director of Quality Assurance. The purpose of key informant interviews was to add detail to the information obtained from the postal survey.

Other key informants to the national survey included representatives of three local Environmental Non-Governmental Organisations (ENGOS), and the Department of Natural Resources (DNR). All key informant interviews were based on the same general interview guide. The interview requested information regarding *EE policy*, *EE partnerships*, *EE programmes* and *EE values*.

In depth study of the third case study school took place from 20 to 24 September 2004. In depth study of the fourth case study school took place from 27 September to 1 October, 2004.

The data collecting protocols used in the national survey in Scotland and in Zimbabwe were the same, except for appropriate changes in the name of office holders. An example is that in Scotland the head of education differs from LEA to LEA. I made it my business to find out the title of each head and his or her name. I personalised the questionnaire by addressing it to them by name. This was to encourage response (Cohen & Manion, 1980, p. 110). In Zimbabwe on the other hand, all mail regarding research, is addressed to the Provincial Education Director (PED), whose office in turn redirects it to appropriate personnel.

Data collection during the in depth case studies

Gaining access

Having identified two case studies in Scotland, the next step was to gain access to the school. In Scotland the protocol is to approach the LA and inform them of the study and the school that you request access to. The headteacher however has the final say as to whether the school would be willing to take part. Access into both case study schools was not a problem in this research. One of the headteachers concerned was a key informant on behalf of the LA and readily agreed. The other school head asked me to come in two days after I called to tell him of my interest in using his school as a case study.

In Zimbabwe it was necessary to visit and receive permission from the Research and Policy Division at the Ministry of Education Head Office before I could approach any employee of the Ministry of Education. For this I had to present a summary of my research, including the names of provinces to which I needed access. I also had to present a letter from the University of Edinburgh certifying my student status and the topic of my research. I received permission and a letter confirming this. This letter had to be produced before the Provincial Education Director (PED) of any province I entered before I could interview any Ministry of Education personnel there. The PED's office would then provide clearance for me to access any officers or schools

in that province. This permission was in the form of an official stamp on the permission letter from the Research and Policy Division. This I had to show to the District Office of the district in which the school was located within that province. After looking for the stamp from the PED's office, a responsible District Education Officer (DEO) had to add a District official stamp on to the same letter. Upon arrival at the school I had to show this letter to the headteacher. This was sufficient for me to be allowed to carry out my research within the school (See Appendix I for a copy of this letter).

The data collection and recording process

In all four cases I spent approximately five days at the school. In the two cases of Zimbabwe the first day was mostly making contact with the school after passing through the PED and District Offices to get clearance from the DEO. That left four days for data collection.

First I discussed the topic and purpose of my research with the headteacher. I then gave the headteacher a few tasks. The first was to identify teachers within the school, which could include him-/ or herself, who could be key respondents, based on criteria such as being, for example, responsible for particular EE projects within the school. I asked also for the headteacher to liaise with these key responding teachers and staff and come up with a timetable of when I could meet with each. I gave the headteacher a Teacher Questionnaire to give to each responding teacher. This introduced the research and described what I would be requiring from them regarding whatever particular area of EE in the school they would be speaking to me about. It also requested that responding teachers, during the course of that week, to meet with me for an interview and invite me to a class or project activity session that showed their programme in action. What tended to happen in all case studies was first a responding teacher would invite me to observe a session of their EE programme in action, and then submit to an interview session, either on the same day, or later during the week. However it also happened that a teacher could complete the Teacher Questionnaire and not see me at all if time was not permitting, or the teacher could complete this, invite me to observe a session and not meet with me for an interview. The Teacher Questionnaire consists of a number of generic open-ended and close-ended questions. Although the teacher may have completed

this beforehand, during the interview (tape recorded), we went through all the questions again, and I added detail to the teacher's completed questionnaire.

There were instances where some teachers were unable to complete the questionnaire before our meeting. This was either due to lack of time, or uncertainty as to what exactly the questions required in the context of their own subject or project. I was expecting this problem, especially in cases where EE teaching and learning activity is an integral part of the core-curriculum. Question formulation for the Teacher Questionnaire was guided by idea of eliciting certain facts regarding individual programmes according to programme theory guidelines. Programme theory elicitation is tailored to programmes that are bounded somehow, by for example their objectives and activities and target population. Identifying these boundaries requires thoughtful delineating of particular EE teaching and learning activities from the other class teaching and learning activities of the core curriculum. This was probably more than the teachers had time, motivation or sufficient understanding of my research to do on their own. I got over this obstacle by negotiating with each such teacher on ways we could bound their EE activities and talk about specific ones that could be used to bring out information about what they were hoping to accomplish, and how, according to the standardised Teacher Questionnaire. I encountered this situation in some instances only in the two case study schools in Scotland. This was in cases where the EE activities these teachers were involved in were an integral part of everyday classroom teaching and learning and had no distinct organisational structure.

The Teacher Questionnaire interview protocol was based on guidelines on how to develop or clarify and describe programme theory given by Smith (1989, Chapter 6 to Chapter 8; Rossi et al, 2004; Chapter 5). These guidelines are part of the result of efforts by various evaluation practitioners to codify its procedures so that *evaluability assessments* may be reproducible by other evaluators (Rossi et al, 2004, p. 136). These guidelines guide the researcher through identification of programme stakeholders; which questions to ask each type of stakeholder to get which type of information; what documents to request and what type of information would be contained in the various types of programme documents. It also clarifies for the researcher how this information will be used in the final analysis. Finally the guidelines inform the analysis of the data collected.

Another task I gave the headteacher was the acquisition of a list of documents listed on a standardised Document Request Form. This gave a list of various types of documents regarding the programme, that I wanted to see if available. During the Zimbabwean case studies I carried with me an all-in-one printer/photocopier/scanner/fax. This was essential as copy facilities were not available in the schools studied. There was electricity so I could photocopy all listed document types that were available on the programme⁷. During the Scottish case studies I used the school's photocopier in one case and my own office facilities in the other case where the school was close to the University of Edinburgh.

In general, data collection followed a daily routine of meeting with identified teachers at a specified time, observing normal or specially planned class activities that showed various EE programmes in action, and interviewing responsible teachers. During observation sessions I was a complete observer, observing without participating (Creswell, 2003, p. 186) and taking notes. These were normally a detailed summary of the whole activity, how the teacher introduced the session, what went on during and how the session ended. I did not have an observation protocol prepared beforehand. I based my observations of class activities on a lesson plan format, making use of my considerable experience as a teacher, lecturer and teacher trainer. I took photographs during all the sessions. Other observations of school ground developments and related community developments were photographed for the record and served to triangulate information from other sources. The teachers also shared with me any photographic records they had of their programme. I scanned those I thought were particularly significant, adding them to those I took myself. In Zimbabwe there are no further ethical issues to be considered in taking photographs of school children once permission to carry out the research has been granted.

In three of the case study schools I was taken around the school and shown all the sites involved in EE teaching and learning programmes within the school. At Mahuwe I was not given a formal tour of the school grounds, but got to see them

⁷ An indication of the lack of resources in Zimbabwean rural schools is one of the schools asking to use my photocopier. I was of course glad to agree.

during three project activity observation sessions. In all instances I took photographs of the school ground sites that were relevant to the EE programmes within the school. In both the Zimbabwean case studies I visited community outreach projects outside the school grounds. At Mahuwe Primary School the headteacher and a teacher of the school took me on the tour of a Community Nutrition Garden in one school, and at St Margaret's Primary School the Teacher in Charge (TIC) and Deputy TIC took me on a tour of the Deputy TIC's homestead which is a pilot of permaculture in a rural homestead. In both instances I took photographs. I also copied a video recording of one of St Margaret's Primary School's Permaculture Open Days. Similarly from Inveraray Primary I watched and copied an audio tape recording of a radio programme that had been done on the school's school grounds development programme, and how it was being used for teaching. Audio-visual materials have the advantage that they are an unconstructive method of collecting data (Creswell, 2003, p. 187).

During the first case study, which was Inveraray Primary, I rented accommodation for a week. Currie High School is in Edinburgh so I could make daily visits. In Zimbabwe, both schools are approximately 200km from Harare, which is where I was based. The nearest available accommodation to St Margaret's was an inn 45km away from the school. I stayed there during the case study, driving to the school each morning and back to the inn every evening. The nearest accommodation to Mahuwe Primary School was an inn 48km from the school. After staying there the first two nights the deputy headteacher made arrangements for me to stay with one of the teachers in her house at the school for the remainder of the days.

I left each case study school on a Friday, carrying with me completed Teacher Questionnaires, tape recordings of all interviews, back-up hand written notes on these interviews, photocopies of EE programme documents, photographs, and in the case of St Margaret's, a tree nursery I had bought at the school – so excited was I about what I had seen there that I was keen to 'go and do likewise'.

Data analysis and interpretation

All interviewees except one LA representative during the Scottish national survey, agreed to be tape-recorded. I transcribed all interviews. The data collected from the national survey included policy documents, LEA specific documents on their policy,

and programmes, returned completed postal survey questionnaires, and full transcripts of tape recorded face-to-face interviews. Often these interviews were one-to-one but in one Scottish LA three officials were present to respond and this was one of the best interview sessions in both national surveys. Data also included tape recordings and full transcripts of interviews with representatives of NGOs working in the field of EE, and their programme documents.

Case data from all in-depth case studies included audiovisual materials, programme documents (see Document Request Form in Appendix I), tape recordings of all interviews, full transcripts of key tape-recorded interviews, completed Teacher Questionnaires. Tape recordings of teachers who had completed the Teacher Questionnaires were not transcribed. This is because I concluded that I had sufficiently captured on paper, and through observation, the details of the programme that I required. Transcribing full transcripts of the interview would not have elicited enough additional information to justify the resources of doing so.

Data analysis consists of examining, categorising, tabulating, or somehow recombining the evidence to address the research agenda (Yin, 1994). The ultimate goal of analysis is to treat the evidence fairly, produce compelling analytic conclusions, and to rule out alternative interpretations (p. 102). I worked directly with raw data to write the final case report for each case study (Patton, 2002, p. 450).

The use of programme theory as a general case study strategy shapes the form of data collection and the steps of data analysis (Yin, 1994, p. 103-104). One has to go into the field with some initial framework for organising and managing the voluminous data collected during fieldwork (Patton, 2002, p. 438; Yin, 1994, p. 102). In this study the interview guides used during the national survey were formulated to obtain information on the themes identified during preliminary field studies (detailed in Methodology and Research Design: Part 1, p.51). These themes thus provided an analytical framework for information obtained during the national surveys. The same interview protocols were used for all four case studies. These protocols were formulated into categories of information required for the description of programme theory, as proposed by Smith (1989) and Rossi, Lipsey and Freeman (2004). They therefore constituted a descriptive analytical framework for analysis (Patton, 2002, p. 440).

Following data collection the qualitative data were organised to describe important, predetermined aspects of individual EE programmes that constituted a 'linear logic model'. These aspects are derived from and predetermined by codified procedures for carrying out the programme theory description of programmes. They are: *aims, objectives, resources/inputs, activities, target populations, problems the programme is facing, external factors, values, intended short term outcomes, intended intermediate term outcomes, and intended long term outcomes*. From those sections of the linear logic models that deal with programme outcomes flowchart displays of each individual programme's impact theory were drawn. These preliminary manipulations of the qualitative data before interpretation were done very carefully (Yin, 1994, p. 103) taking a time period of six months to accomplish for all case study schools. This is in line with Patton's (2002) exhortation: that the analyst's first and foremost responsibility consists of doing justice to each individual case. All else depends on that (p. 449).

Programme documents and audiovisual materials were analysed by going through them and selecting and coding sections using the categories found in the linear logic model framework. This information was then added to the programme's linear logic model, if it was not already there from another source. However if it was there from another source, this new information may modify it to increase accuracy. There were categories of information identified for each EE programme that did not have a category on the linear logic model framework. This information was categorised into sometimes unique categories for individual programmes. For example, whilst some programmes have a motto, most do not and so this would be a unique category. Mostly however these alternative categories (e.g., programme history, and identity of partner organisations) were recurrent for most programmes. Such information was appropriately coded and was added as thick descriptive text in introductions to the programme. Other analytical categories were information related to each programme's organisational plan. This included programme services (those specific activities that constitute the programme's role in the target-programme transactions that are expected to lead to social benefits), and also functions that provide essential preconditions and on-going support for the programmes' ability to provide its primary services. An example is personnel management, facilities acquisition, clerical support, and maintenance (see Rossi et al, 2004, pp. 142-145).

The REEP report presented in Part 1 illustrates in detail the form of description that constitutes programme theory. Although the service utilisation plan was articulated for this preliminary case study, it was not articulated for all other case studies. This is because its articulation does not significantly assist the address of research questions guiding the present study.

The first output of data analysis is a description of the EE programmes at each case study school. According to Patton (2002) description forms the bedrock of all qualitative reporting. Description comes before interpretation. Interpretation involves explaining the findings (p. 438).

Validating the accuracy of the findings

In my study I triangulated different data sources. Triangulation is a procedure for checking the accuracy of findings by examining evidence from different data sources and using it to build a coherent justification for themes (Creswell, 2003, p. 196).

Data collection for each case study school included interview data from programme personnel and managers, data from observations, audiovisual material and programme documentation. Programme documentation that was requested and used whenever it was available for each case was: authorising legislation, debates, committee reports, regulations and guidelines, research, evaluation, audit reports, memoranda (e.g. administrative), speeches, documents describing the organisation of the programme and staffing, grant applications, reports from the field, publicity brochures, press releases (including radio broadcasts), journal articles, books, proposals for outside funding and video recordings. Evidence from as many of these sources as possible was used to build a coherent description of each programme. I gave all data sources equal weighting. This is because as a researcher I was unable to say which documents gave more reliable information than another. I could not always assume that official policy documents gave the most reliable information on policy drivers on the ground. This is because there is often a discrepancy between official policy, or the lack of it, and practical drivers at 'grassroots level' that take on policy characteristics, becoming in reality the operating policy. There is also often a gap between official policy and practice in the classroom (Ho, 1998). In reality different types of data sources gave different types of information and where sources

gave contradicting information other sources were studied and combined to give what I judged to be the most accurate picture.

I used member checking (Creswell, 2003, p. 196) or an iterative process (Smith, 1989, p. 75; Rossi et al, 2004, p. 152) to validate programme theory description. Member checking is a process of referring data and interpretations back to data sources for correction, verification and or challenge (Lincoln & Guba, 1985, p. 108). For this research it involved sending back first draft case study reports for key respondents at the respective schools to read, comment and correct errors and omissions. In all four case study schools I went back to the school to meet with key respondents in the study. The number of these who met with me for the iteration sessions varied with each school. At Inveraray Primary I met with the Inveraray. She had only minor corrections to make and these only to the historical section in the introduction. The Environmental Projects Coordinator at Currie High met with me for the iteration session. She made a lot of very helpful corrections and comments on the report at the meeting and through further e-mail correspondance. At St Margaret's Primary School one of the key respondents, the TIC in charge of Permaculture had left the school by the time I went to the school for the iteration visit. The report was read and commented on by the former deputy TIC, now the TIC for Permaculture in the school, and the new deputy TIC. At Mahuwe a focus group was held for the iteration process. This involved the headteacher, the deputy headteacher, and three other teachers. It was a very good and effective session, and the process took less time than the other sessions where few key respondents were available to participate in the iterative process.

Another method that Creswell (2003) suggests for validating the accuracy of findings is to use rich, thick description to convey findings (p. 196). The use of programme theory and the way that this approach guides the analysis and reporting of the qualitative case study data circumvent the use of this in this report.

The result is not an exact replica of every 'nitty-gritty' aspect of the programmes. According to Smith, 1989 (p. 75) it does however reflect with reasonable accuracy the major assumptions underpinning the programmes, and the critical activities that are going on. A friend agreed to assist by reading over the transcript of the case study reports and check for the soundness of the arguments in the analysis as well as

repetition. This was especially helpful as the layout of a programme's theory under its specified sub-headings (see p.104) made the text appear repetitive regarding certain aspects that fell in more than one category of activities.

The qualitative narrative

Each case study report consists of an introductory section. This gives the geographical location of the school; the history of EE education at the school; reveals the problem base that motivates activities within the school, and provides other information I thought would be important to an understanding of the case and that did not fall into any other analytic category. This is followed by a presentation of all EE programmes (or representative topics for teaching and learning activities that are an integral part of the core curriculum) within that case study school. This presentation (of each programme) consists of its history – where appropriate; its organisational theory – consisting of its objectives, services that it provides and its resources and prior functions, and finally its impact theory. For the two Zimbabwean case studies only a maximum of two impact theory diagrams are presented within the thesis for each programme. The rest are presented in Appendix III - VI. The complete linear logic model is not presented in the case description but may be found in Appendix III - VI. The final section of the narrative of each case study school is a description of the findings of the research.

A summary of how programme theory has been used and analysed

In this section I summarise the manner in which Programme Theory is used in the present research, the value it adds to the research process and the plan for its analysis.

Initially programme theory is used as a design tool to structure a study of EE within a section of formal schooling. Environmental education in this sector is complex in that while policy provision exists for its presence, it has historically not existed as a formal subject, a situation which remains generally true at present. Programme theory provided a pre-determined plan for the investigation at each case study school. The codified procedures available for drawing programme theory (see Smith, 1989 and Rossi et al., 2004) provided a framework for initial data collection and acted as a preliminary data analysis framework. The resulting clarity of research procedure decreased anxiety in both the researcher and staff at each school during the week of data collection. The various elements that constitute programme theory (see Figure

3.1) guided the report on individual EE programmes at each case study school, taming contextual complexity, allowing interrogation and making the programmes *evaluable*. The temporal sequencing of components in the impact theory of individual EE programmes as well as the linear logic models (see Appendix III - VI) are used as valuable analytical tools that highlight important issues regarding individual EE programmes and allows ease of study of these in all case study schools, facilitating within-country and cross-country comparison and contrast.

For the present study interrogation of programme impact theories involved searching for emerging themes that would be used for a summative description of the impact of environmental education in the two countries. A colleague was asked to study the impact theories and verify these themes. At the risk of pre-empting the case study reports, but for the purpose of reader clarity I will state at this point that the themes that emerged from an interrogation of the impact theories in the four case study schools are: *environmental citizenship benefits*, *social and community development*, *pupils' personal development*, and *school benefits*. A description of how EE programmes at each individual school contribute to each of these is presented together with *an analysis of the contextual imperatives for action* at the end of each case study report.

As well as searching for themes in programme impact theories it was also my intention to use my experience of the Hungerford and Volk (1990) model gathered during the REEP case study (see Figure 3.3) to analyse the type of outcomes present in the impact theories of EE programmes in each individual school. Thus, using Hungerford and Volk's classification of predictors of environmental citizenship behaviour (see p.44 and Figure 2.2) I was able to consider the overall extent to which they (individual EE programmes) develop environmental citizenship behaviour. This was done in Figure 5.1,

Figure 5.2, Table 8.1, Table 8.2 and Table 8.3. A summative description of outcome themes and type was used (in Chapter 8) for within-country and cross-country comparison and contrast. Based on this contrast I make (in Chapter 9) propositional generalisations that address research questions two, three and four.

SUMMARY

Using the lessons learnt during the preliminary case study of the REEP, a qualitative approach was adopted using nested case study as a strategy to study EE in Scotland and Zimbabwe. The main research is an in-depth study of four schools, two primary schools in Zimbabwe, and one primary and one secondary school in Scotland. These represent perceived examples of 'good practice' in their respective countries. They were selected using intensity sampling during a national survey of EE in each country. Data collection during the national surveys included postal questionnaires followed by face-to-face interviews. During case studies data collection involved interviews with school headteachers, teachers and representatives of partner organisations; observations and document analysis. Programme theory was used to provide a predetermined framework for data collection and analysis within the cases. Triangulation of data sources and member checking or iteration was used to validate programme theories. The impact theories of all EE programmes are used to draw out major themes regarding their real and projected impacts. These themes are the basis of the contrast of EE practice in the two countries and lessons that can be learnt from them. In the end propositional generalisations regarding the impact of EE and the contextual influences that mitigate this impact are made.

4 SCOTLAND: THE CONTEXTUAL FRAMEWORK

The context of EE in Scotland is described according to four guiding themes. These themes are *policy*, *partnerships*, *programmes* and *values* or *underlying principles*. These themes guided the National Survey and the case studies of individual schools. They were derived from a preliminary survey of the field (of EE) in Scotland done as a prelude to focussing my research questions. Before presenting the description of the Scottish context I will outline the way the national survey was carried out and thus the source of the information presented in this Chapter.

A postal survey, addressed to the Directors of Education, was sent out to all 32 Scottish local authorities. The questionnaire requested information on the nature of the local authority; information for use in identifying key informants and whether these would be willing to be interviewed; the policy framework that guided the LA's EE activities; and the LA's partners in EE provision. The questionnaire also requested them to share any LA documents that give information about EE programmes within their LEA. Information from these documents was used to complement information from the completed questionnaire. Follow-up face-to-face interviews were based on a general interview guide (Patton, 2002) that requested information regarding EE *policy*, *EE partnerships*, *EE programmes* and *EE values* (see p.54). Except for one the telephone interview, all interviews were tape-recorded, one-to-one and structured. They were all based on the same general interview guide. An attempt was made to interview LA representatives from different geographical areas of Scotland. Other key informants interviewed were representatives of voluntary organisations (RSPB, SNH, Eco Schools), headteachers, a Local Agenda 21 officer and a member of Her Majesty's Inspectorate of Education (HMIE).

POLICY

A description of the foundation of EE in Scotland's schools has to begin with an examination of the UK and Scottish government policy framework.

The response of the UK to Agenda 21's call to national governments was presented in the publication *Sustainable Development: The UK Strategy* (HMSO, 1994). This document was built directly upon the UK's environmental strategy (*This Common Inheritance*) which was adopted in 1990. The UK also prepared a Climate Change

Programme, a Biodiversity Action Plan and a Forestry Programme, all of which were published parallel to *The UK Strategy*. The *UK Strategy* reflects a strong belief that the pursuit of a sustainable economy involves all sectors of the community: central and local government, industry, voluntary bodies and individuals. This belief was reflected in the wide consultation with these bodies in preparing the *UK Strategy*.

Scotland's response to the national call to environmental attention was the former Secretary of State for Scotland, Ian Lang, MP, in 1990 setting up the Working Group on Environmental Education, which resulted in the publication *Learning for Life: a National Strategy for Environmental Education in Scotland* (Scottish Office, 1993). In June 1995 the Scottish Office published *A Scottish Strategy for Environmental Education*. In this publication the Secretary of State for Scotland commends *Learning for Life* to all seeking a guide as to his policy on environmental education, expressing explicitly his intention to adopt it as the basis for a Scottish strategy for environmental education. The publication *Learning for Life* argues that environmental education, as a sustained learning experience, is necessary to support policies for sustainable development and effective conservation of the environment.

Learning for Life has been the foundation on which many sectors have based their own policies for environmental education. Paragraph 4.50 of *Learning for Life* states that the success of the national strategy will depend on the support of bodies with the expertise and resources to invest in it. 'They will be primarily in government, the local authorities, the formal education system, business and industry, organisations representing rural and urban sectors, some of which will be voluntary organisations' (p.80). They are not expected to work in isolation, but networking between and within sectors is a key element in the implementation strategy.

PARTNERSHIPS

As a result of policy-based and other imperatives, which will be discussed later in this section, the Scottish Central Government (through its statutory bodies), local authorities, schools and voluntary organisations come together in various partnerships around Scotland. What follows is some detail that includes the definition and functions of these partners in the field of EE in Scotland.

Local Authorities

One of the outcomes of the Rio Summit in 1992 has been the appearance in a number of countries, including the UK, of Local Agenda 21. According to UK government pronouncements, Local Agenda 21 is accepted as a key instrument for delivering more sustainable development. The Prime Minister, Tony Blair, in his speech to the UN General Assembly Special Session, gave all local authorities until the year 2000 to prepare a Local Agenda 21 (Speedie, 1998). Local Authorities are closely concerned with implementation of local programmes for sustainable development. The reasons for this include the fact that local government is the closest level of government to the community and as many as 14 chapters of Agenda 21 have been identified as relating directly to areas of management where local authorities play a primary policy or service role (Speedie, 1998).

Local governments in general fulfil a long-term environmental stewardship role in matters such as waste management as well as planning and control of development. They are in many cases significant investors in their area and are major purchasers of goods and services. They are regulators of activity in the local area, have statutory planning powers and have environmental health control. Local authorities have statutory powers relating to education. Almost as important is their employee training function, as they are often a major or significant employer in their authority. They have the capacity therefore to exert considerable influence over the behaviour of their employees through training and awareness raising. This responsibility over a wide range of functions which impact the environment is one of local government's key strengths. It enables the development of a strategic approach through its corporate services, in consultation with other organisations (Speedie, 1998).

As sustainable development has become a high priority for government this has led in turn to a higher burden being placed on the education system to support it. Speedie (1998) states that for the education system to succeed where it has failed in the past, it is important to link environmental education to Local Agenda 21. The Regional Environmental Education Forums (REEFs) pointed the way towards a renewed partnership between local government, organisations concerned with environmental education and others *with needs in that area*. They identify potential benefits to local authorities and to environmental education. One of the benefits would be to bring environmental education into the mainstream activity, where in the past it has been

marginalised, lacking time, space, resources, depending only on support from interested and committed individuals. As it was unlikely that additional resources would be available, better use had to be made of available resources. Hence the challenge for education for sustainable development was to create partnerships and find the resources to take forward environmental education.

The Government Environmental Agencies

There are a number of government agencies, also called non-departmental public bodies (NDPBs) or statutory bodies which the government supports and which play key roles in the provision of environmental education in Scotland. Examples of government agencies include SportScotland, Keep Scotland Beautiful, the Scottish Tourist Board, Learning and Teaching Scotland (LTS) (formerly the Scottish Consultative Council on the Curriculum - SCCC), the Scottish Arts Council (SAC), Scottish Natural Heritage (SNH) and the Scottish Environmental Protection Agency (SEPA). In general these government agencies help to provide a bridge between government policy within their particular areas of responsibility and the people affected by it, in a way that is human and personal. They have special advantages for developing holistic, systematic approaches for education, and a unique access to local knowledge, and to data unavailable to educators from anywhere else. I will discuss the work of the SNH in a little more detail to illustrate the role of such government agencies in environmental education.

Scottish Natural Heritage was formed in April 1992 by an act of parliament. It was a merger of the Countryside Commission for Scotland (CCS) with the Nature Conservancy Council for Scotland (NCCS). It inherited all the powers and responsibilities of its predecessor organisations. Scottish Natural Heritage is the government body responsible for the conservation and enhancement of Scotland's natural heritage, wildlife, habitats and landscapes. It advises on policies and promotes projects that aim to improve the natural heritage and support its sustainable use. It designates and promotes protected areas including Sites of Special Scientific Interest (SSSIs), National Nature Reserves (NNRs), Special Protection Areas (SPAs), Special Areas of Conservation (SACs), National Scenic Areas (NSAs) (SNH, 2005b). Scottish Natural Heritage outlined its envisaged contribution to environmental education in Scotland in the publication *SNH Environmental Education Initiative* (SNH, 1995). Their approach followed the lead given in the

recommendations of *Learning for Life*. It sees as one of its contribution to environmental education nationally as

Encouraging co-operation and co-ordination among organisations providing education about the natural heritage, and between the natural heritage sector and other sectors (SNH, 1995).

In the early days after its formation SNH realised that it needed to broaden its educational agenda beyond the narrow confines of the natural heritage. It recognised working in partnership as a key guiding principle in its working and essential to achieving its environmental education objectives (Borradaile & Grant, 1998). Scottish Natural Heritage has an extensive grants programme, through which it supports other organisations or partnerships to deliver projects and products that complement SNH's aims, effectively multiplying its own impact as an organisation working in the field. It supports and uses training as a way to both increase and improve skills as well as promote new activity while also making strategic partnerships with other agencies and NGOs on agreed projects and initiatives.

Scottish Natural Heritage grant-aids Ranger Services that are employed by local authorities, charitable trusts and private estates that are under heavy pressure from visitors. These ranger services in Scotland make a significant contribution to the delivery of SNH's functions for conserving, facilitating public enjoyment and fostering understanding of the natural heritage (SNH, 1997).

Scottish Natural Heritage believes that Scottish children deserve better than to play out on dull tarmac and concrete surfaces, especially when their own country is renowned throughout the world for its natural beauty (SNH, 2005a). The organisation wants to ensure that children have the best opportunities to discover the wonder of the outdoors and to encourage their innate curiosity about the natural world. They believe that such early experiences will help children value their outdoor surroundings, growing with them as their horizons develop from their childhood neighbourhood to the wider world of Scotland's natural heritage (SNH, 2005a). Thus SNH encourages better use and enjoyment of Scotland's school grounds, by direct funding through its School Grounds Grants Scheme; indirect funding through block grants to local school grounds partnerships which award grants on behalf of SNH and other funders. They also grant aid Grounds For Learning, Scotland's school grounds charity who provide practical information and advice and promote better use of

school grounds (SNH, 2005a). Early in 1995 SNH and the UK-wide charity, Learning through Landscapes (LTL), agreed to join forces to set up the Grounds for Learning Partnership project. This was in response to an increased demand for advice and information from schools on how to improve their school grounds. This project was to carry on the work started by the Grounds for Learning Forum whose initial role was awareness raising and sharing good practice. Originally a three-year project, the partnership proved so successful that it has been developed into an organisation in its own right (Kenny, 1998). Since then the project has strengthened, running training events and national conferences, providing an information and advisory service, producing resources for Scottish schools, encouraging school grounds related research, networking with other organisations and generally raising awareness about the importance of school grounds nationally. In 1997 GFL worked with Her Majesty's Inspectorate to produce draft good practice guidelines for the Inspectorate. Also in 1997 two corporate sponsors agreed to fund GFL's work in Scotland and the School Grounds Award Scheme for schools in the northeast of Scotland was established. Grounds for Learning represents LTL in Scotland, working as LTL in Scotland (GFL, 1999).

The Voluntary Organisations

The publication *Learning for Life* (Scottish Office, 1993) sees voluntary organisations as “a mainstay of environmental education now and in the future” who have “consistently applied pressure for the development of environmental education” and “been a source of enthusiastic and knowledgeable people” (p.29).

There are many Scottish voluntary organisations with a range of remits and roles ranging in size from the National Trust for Scotland, which in 1998 had 230,000 members, to local groups with a few dozen members. Environmental Education is the concern of two kinds of voluntary organisation – the larger general environmental bodies such as the Scottish Wildlife Trust, the RSPB and World Wide Fund for Nature (WWF), and the smaller specialist organisations with education as a major part of their remit, such as the Scottish Field Studies Association. According to Lavery (1998) these organisations, like all voluntary organisations, fall into two main types, the ‘Third Force’ consists of organisations largely funded by the government, and delivering government aims more efficiently and flexibly than government agencies can. ‘First Force’ organisations, on the other hand see themselves as agents

of change, and seek that change both in government policy and society at large. Few Scottish organisations fall unequivocally in either of these categories. According to Lavery (1998) the voluntary sector could not be expected to provide EE in the long term to the Scottish population without significant levels of financial input from government; or become more 'Third Force'. He admitted however that many would most likely want to remain, or become 'First Force'. To the present day however, very little support is available to NGOs directly from government, coming instead mainly from individuals, private sources, e.g. companies, charitable sources or grants, the lottery, and statutory sources e.g. SNH, and local enterprise companies.

From being small specialist organisations in the 1970s, controlled by a dedicated membership and delivering specialist services such as securing nature reserves, or directing funds to conservation projects, many voluntary organisations have grown dramatically to have large professional staffs, large memberships and complex services, that include policy and lobbying roles (Lavery, 1998). The term NGO is useful in distinguishing these organisations from private companies, national and local government departments, and NDPBs. The dividing line between NGOs, government bodies and private companies has however become blurred, and hybrid organisations are now common. Thus from the 1990s the roles of government, NDPBs, and NGOs have converged, and, it is not always meaningful to draw a distinction between the different types; aims and roles being considered more important. Since *Learning for Life* NGOs have developed increasing confidence in championing EE. This has led to greater NGO involvement in consultation at many levels. For example, NGOs are represented in the Education for Sustainable Development Group (ESDG) and the Biodiversity Publicity, Information and Awareness Group. At international level NGOs have made input at UN Commission on Sustainable Development (CSD) meetings, at the Rio Summit of 1992, and at the UN General Assembly Special Session in 1997.

Since the 1970s NGOs have worked in partnership with government agencies (SNH, SCCC), with the increase in size and experience of the NGOs now meaning that these are full partnerships rather than client relationships. The 5-14 Guidelines have provoked environmental organisations into gearing up their efforts as significant resource providers. The potential for duplication and subsequent waste resulted in the Scottish Wildlife and Countryside Link (SWCL), SCCC and SNH in 1995 setting up

the Common Agenda Workshops. These brought providers together, sharpening thinking about quality and appropriateness (Barr & McAndrew, 1998). Further, three NGOs were heavily involved in the *Learning for Life* group.

The need to network and the development of structures to allow for this, has been an important feature in the development of environmental education in the UK and in Scotland. This need to work together is unlikely to go away, and increasingly wider networks are being formed.

Schools

Ham and Sewing (1987-88) identified barriers to environmental education in schools and categorised them into four broad groups; conceptual barriers, logistical barriers, educational barriers and attitudinal barriers. Conceptual barriers stem from a lack of consensus about the scope and content of environmental education. Logistical barriers stem from a perceived lack of time, funding, resources, suitable class sizes, and so on. Educational barriers stem from teachers' misgivings about their own competence to conduct environmental education programmes. Attitudinal barriers stem from teachers' attitudes about environmental education and science instruction. These barriers were found in other studies a decade later (Shuman & Ham, 1997 and Robertson and Krugly-Smolka, 1997), and continue to dog environmental education in schools today. On the subject of introducing initiatives into schools the Scottish Executive (2003) found that educator time is too greatly employed in non-educational functions and in responding to many initiatives (p. 4, 6, 9). Education is resource intensive, in terms of money and time. However, increasing financial investment in "educating" cannot increase the time that students are available to "be educated". In Scotland, EE, like other initiatives in schools, is directly competing for development activity and teaching time within an education system resource inundated with many agendas and initiatives (Deryck Irving Associates (DIA), 2002)

Although by no means exhaustive of the present situation, statements by authoritative stakeholders, made during the national surveys in the present study, reveal the continuing nature of some of these barriers:

Constraints (...) Here is what I am told. I am told that secondary teachers are constrained by the syllabus and the timetable ... they complain about an overloaded syllabus, to be taught in preparation for the exams. Therefore they feel they cannot take the pupils out of the classroom to work. I have also been told its been discipline. Discipline appears to be a problem in some

schools. They will not risk taking some pupils out of doors. The other problem regarding the timetable is actually getting enough time to take pupils out of doors and back before the lesson starts (Representative of a Scottish Environment Centre, personal communication, April 1, 2004).

(...) these programmes in most cases are run by fairly newly qualified teachers from these colleges, who have actually gone through the programme during their college training. ... Now those who are not mounting these programmes its largely because of teachers who belong to the old school. They are scared of things that have to do with science, and research to them doesn't make any sense at all.

(Education Officer (Science), Province B, personal communication, September 9, 2004)

Certain schools are very poor. You are struggling to get textbooks; you are struggling to get pieces of chalk for your teachers to do normal teaching. You wouldn't then burden your teachers by saying, 'now lets get a bit of funds to purchase this and that (for an EE programme.)'

(Education Officer (Science), Province D, personal communication, September 15, 2004)

There has been a tendency to encourage not just knowledge but an action component in EE. Robottom (1985) cited in (Robertson & Krugly-Smolska, 1997) wrote that 'environmental education presents a challenge to existing patterns of schooling. Its enquiry orientation is a challenge to habitual patterns of schooling; its interdisciplinary nature is a threat to conventional disciplinary curricular structure; its emphasis on outdoor education presents problems for existing organisation patterns'.

The barriers discussed above have for many years resulted in a theory/practice gap in the field of EE. The various partnerships for EE provision formed by the Scottish Central Government (through its statutory bodies), local authorities, schools and voluntary organisations serve a lot of needs and motivations, as discussed below.

International agreements and conventions guide the UK government's actions. By being signatories to these, the Government has a mandate to ensure that there is environmental education provision in the country. They have developed *The UK Strategy* to guide national policy development. Scotland's response, *A Scottish Strategy for Environmental Education*, is *advisory* rather than compulsory. The government has not committed any significant amount of money to environmental education, and has made this clear from the onset, recommending from even then the use of partnerships to maximise the use of available resources. It is obvious that the amount of money the government makes available to SNH and other statutory bodies to work in partnership with local authorities, schools, and voluntary agencies is far

less than the amount they would need for a commitment to environmental education for all schools in Scotland.

Local authorities have a mandate to guide schools in curriculum delivery and are expected to develop policy and ensure quality. Local authorities in turn devolve some of these responsibilities to headteachers and the schools themselves. Partnerships with voluntary organisations and the government's statutory bodies provide additional resources, including skilled and knowledgeable manpower. This removes the necessity for local authorities to employ skilled staff to deliver environmental education, or indeed to train existing staff. High staff turnover makes training of teaching staff very difficult for local authorities. Local authorities are aware too of the benefits of partnerships in alleviating barriers (educational and logistical) to EE in schools. Few teachers have confidence in their own ability to run environmental education fieldwork activities, especially at venues outside the school grounds. Teachers do not have the time, or if time could be created, do not have the motivation to plan such fieldwork activities. Partnerships circumvent most of these programmes and so planning, programme content, and alignment of this with the curriculum is often done by the partners. This would leave the teacher only with the responsibility of sending out permission slips, and organising follow-up activities. In these partnerships the voluntary organisations, sometimes together with the local authority source required funding, subsidising the amount to be contributed by schools and the local authorities themselves. Voluntary organisations sometimes produce teaching materials to back their programmes. In such instances teachers do not have to wrestle with what environmental education is, what ESD is, and how it should be taught. Even teachers' worries about class size and manageability during fieldwork activities may be addressed as partnerships often provide extra, *skilled* hands. In these circumstances the teachers' role would primarily be in maintaining student discipline.

The voluntary organisations are very happy to work in these partnerships. First, a lot of them have environmental education and conservation as a large part of their mandate. Their membership expects them to fulfil this mandate through appropriate activities in order to maintain their funding. The greater the extent of their activities the greater the funding voluntary organisations command from sponsors.

Partnerships formed in the pursuit of EE go a long way in addressing the theory/practice gap that plagues environmental education in schools. Through these partnerships hopefully all stakeholders are brought in line with the real and immediate concerns of teachers and teaching practice. With these practices and concerns in mind stakeholders can sort out the conflicts and ambiguities inherent within environmental education theory and decide what can be realistically accomplished within the context of schools. By working together at curriculum development level and at the policy level these partnerships develop a common foundation based on mutual understanding and can build into their organisational plans realistic expectations from one another towards the fulfilment of a common purpose.

UNDERLYING PRINCIPLES/GUIDELINES FOR THE SELECTION OF PROGRAMMES.

Different programmes are running within schools in the different LEAs of Scotland. Although ultimately the headteacher decides what programmes run within their school, LEAs often buy into particular programmes and strongly encourage their schools to participate in these. A criterion for selection is that the programme should make learning and teaching better (Primary Advisor, City Council A, personal communication, March 17, 2004). Although organisations may approach schools directly, and headteachers can make the decision to take on a programme, it is customary and preferred, to receive clearance from the LEA first before approaching a school. Organisations would be requested to present to the LEA their programme, initiative or project. Responsible LEA officials check for issues such as whether it is something that will cost the school or the council's Education Department money; which will not infringe on health and safety regulations, as well as verifying the identity of its proponents.

- There is a general agreement in Scotland that EE programmes should be based in the school curriculum and should stimulate and enrich their experiences. For example:

It wouldn't make any difference whatsoever, that I could have the strongest of values, unless I can link it into what is happening in the curriculum, if you like, the chances are it cannot be picked. So what we are trying to do, is, despite our strong opinions if you like, we have got to ensure that everything that we are trying to introduce to schools, is linked to the curriculum (City Council B Education Industry Liaison Officer).

Err (laughs) it is possible to run programmes and produce publications that don't really work within the education system (*Representative, RSPB Scotland, personal communication, March 23, 2004*).

And through the workbooks the pupils learn certain things about the environment, which will also help them with their study in school. So the materials we produce are closely linked to classroom based study. It's an absolutely crucial point (*Representative of a Scottish Environment Centre, 1 April, 2004*).

We all know that we have the 5-14 Curriculum which is required of us to deliver. So we have basically looked at each stage (...) what is required to be delivered and then we have looked for relevant resources to do that. We have looked for resources that will stimulate, that will allow the children to have creativity and will allow their lives to be enriched. And within that that is where most of our environmental influence has come (*Inveraray, A primary school in Scotland, personal communication, April 26, 2004*).

- Any materials produced that go beyond the curriculum is not popular with teachers and schools, as one of Scotland's Environment Centres has experienced.

In the early days we had to be practical. Now we try to, if you like, influence how they (schools) teach, and what they teach. And Traffic First was really the first big project to do that. We couldn't really find an environmental education programme at all (in the schools), that was looking at road safety in particular. There were programmes looking at pollution, but not involving traffic. So we said lets put all this together, and look at environmental issues, and it does. Em...it was a bit of a difficult one, and we have got an awful lot of the packs still there unsold. It isn't seen as being...it goes beyond the curriculum a little bit as it is you see. Therefore they will go, "no, it's going too far, I haven't got the time" (*Representative of a Scottish Environment Centre, personal communication, April 1, 2004*).

To avoid this problem, one of the aims of the RSPB's Education Policy is to 'Promote Education for Sustainable Development within the curricula in all the four UK education systems' (RSPB, 2005).

- Education for Sustainable Development and EE in Scotland is frequently guided by the belief that pupils can only be taught to care for the environment initially through enjoyable outdoor experiences.

It is expected that while based on the curriculum, outdoor activities should also stimulate and enrich pupils' experiences, encouraging an interest in the environment (*A. Paterson, personal communication, April 27, 2004*). Paterson also states that the experiences at Inveraray Primary School reveal that learning outdoors promotes positive behaviour under certain circumstances (*personal communication, April 27, 2004*).

Similar views are held by others, for example:

I think the pupils have got to be introduced to the environment very very early on. The earlier time the better. Because you want to, if you like, through their knowledge and understanding of

the environment, you want to influence how they actually behave....They should enjoy being there. Enjoy finding out about the built environment, the natural environment, and really get to explore their relationships with it in a very very simple way. And if you do that, they will, I think, enjoy it, see the need for taking care of it, and will hopefully temper their behaviour and attitude towards it,... (*Representative of a Scottish Environment Centre, personal communication, April 1, 2004*).

- Educating future decision-makers

There is the view of the young people as the decision-makers of the future. Informed citizens who will put the right political pressure as an electorate, and make the right decisions.

One of the overriding values is that we want to create in our young people responsibility, an understanding of sustainability. And really an awareness that they are citizens of tomorrow and that they need to be aware of what has to be done to preserve the environment as it is at the moment (*Primary Advisor, City Council A, personal communication, March 17, 2004*).

Because obviously the seven topics (of Eco Schools are) (...) a vital way of bringing up the next generation to address some of the issues we are currently facing, if they have already gone through the process and they are more aware of these issues ... and there is a certain value in them being much more aware when they come to be the future decision makers (*Environmental Strategy Officer, City Council D, personal communication, March 12, 2004*).

That's correct. And also the pressure they can put on elected members. Because elected members are elected, are citizens who have been through the electoral process. Citizens can be better (...) (inaudible) educated, better raised...whatever (laughs) emm and obviously the political process will be enhanced by that (*External Funding Officer, City Council D, personal communication, March 12, 2004*).

- Environmental education and ESD are seen as part of Citizenship Education, Enterprise Education and Health Education in some LAs.

Under Citizenship Education pupils are encouraged to take responsibility for their lives, their environment and everything around them. Under Enterprise Education 5-14 Guidelines pupils are expected to do two activities in the primary school and one in early secondary. There are three parts to Enterprise Education in Scotland. Pupils can either run a small business, where they sell something, or they do an environmental project, where they take responsibility, or they do a community event. All these activities allow for the carrying out of EE activities. Pupils may set up a recycling project that is income generating. They can look at how water is wasted within the school, or how energy may be conserved. The council guides the schools in doing things that help them 'tick several boxes' at once.

So you can, in an enterprising way, run an Enterprise Project which also ticks the box for Citizenship Education as well, and that sort of thing. Because the Scottish Executive keeps pushing out, and it happens in any Central government, ideas that are all politically driven, and somehow or other, we on the ground have to try and ensure that these things happen in schools (*City Council B Education Industry Liaison Officer*).

In some LAs Local Agenda 21, Sustainability, Biodiversity and the Environment are under the umbrella of Citizenship.

According to *Learning for Life* (Scottish Office, 1993) Health Education overlaps broadly with EE: they are both concerned with fostering a positive approach to healthy living, and they face similar problems in doing so. Health educators have long abandoned the simple paradigm that changes in knowledge will lead to changes in behaviour. Health educators now recognise that environmental changes are necessary to support individual behaviour change, leading to healthier lifestyles. Environmental education then can derive much from health related behavioural research and the practical experience of health education about how to motivate change in public behaviour (p.34).

VALUES GUIDING LOCAL EDUCATION AUTHORITIES IN ENVIRONMENTAL EDUCATION PROVISION

The values that guide EE provision in Scotland are derived from national Curriculum Guidelines, National Priorities, Local Agenda 21, Citizenship and Health Education Guidelines that come from the Scottish Executive. The Scottish Executive through the Scottish Executive Education Department (SEED) communicates these values to the LAs, who incorporate them into their policies. LAs communicate these policies to their schools which incorporate these into their own (school) policies, and Action Plans.

PROGRAMMES

The programmes which involve a component of EE that are running in Scotland are listed in Table 4.1. Different LAs run different programmes, as do different schools within those LAs. Table 4.1 lists all the programmes mentioned by the 20 respondents from the 32 LAs surveyed at the beginning of this study.

ECO SCHOOLS

Eco-Schools is a programme for environmental management and certification, and sustainable development education for schools. It is an international programme that is run and managed by the Foundation for Environmental Education (FEE) based in Europe. The programme was developed in 1994 to involve young people in finding solutions to environmental and sustainable development challenges at the local level,

as identified at the UN Conference on Environment and Development of 1992 (FEE, 1995). It is being implemented in several countries in Europe, Africa, and South America.

At the end of 2001 the Scottish Executive adopted Eco Schools as a performance measure for National Priority 4 of Education (The Education (National Priorities) (Scotland) Order 2000) for both Councils and their schools. Since this happened all LAs have encouraged their schools to register and participate in Eco Schools. By-and-large the present study revealed that LAs view the Eco Schools programme in a positive light. Its seven elements are seen as encompassing Citizenship, Health and EE. This is especially desirable as it allows schools and teachers to 'tick several boxes' while in the pursuit of their Eco Schools awards. Further to this end schools are encouraged to tie in the pursuit of core curriculum areas, such as recycling within the Science curriculum, with the aim of gaining Eco Schools awards.

All responding LAs are taking part in Eco Schools and are encouraging their schools to register. The fact that Eco Schools has been made a performance measure for National Priority 4 has a coercive element to it.

(...).from the moment it was selected as a national priority, it ceased to matter whether you thought it was a very very well designed product. What then became important was supporting the product so that it became a good sustainable development education programme. Rather than sitting back and say, 'no I have never liked Eco Schools'.

(Representative, RSPB Scotland, personal communication, March 23, 2004).

Table 4.1 Environmental Education Programmes in Scotland's LEAs

Programme Description	Number of times cited in total
Eco Schools	*****
School Grounds Developments	*****
Recycling (specific mention)	*****
Work within the ES curriculum	*****
Country Park and Park Ranger Services	***
Energy Conservation	**
Walking Projects	**
Following an Award Scheme	
<i>John Muir Award</i>	**
<i>Hams Moore Award</i>	*
<i>Pride in Perth Scheme</i>	*
<i>Duke of Edinburgh</i>	*
Science Centre Visits	*
Theatre Production	*
Competitions	*
Waste minimisation	*
As part of Citizenship	*
As part of Enterprise Education	*
RSPB officer services	*
RSPB Project with Island Schools	*
Local Woodlands Services	*
Farm Links	*
Shetland Field Studies staff services	*
Outdoor Learning Policy (specific mention)	*
Green School Guide	*
Piloting resources for Scotland's Global Footprint Programme	*
SNH School Travel Grant Scheme	*
"Salmon in the Classroom" – conservation activities	*
Agenda 21 activities (specific mention)	*
Biodiversity work	*
Biodiversity Partnership Grants	*
Clyde in the Classroom	*
Clean Glasgow	*
Country in the City days	*
Joint projects with SNH	*
Playground games – equipment painting	*
National Parks	*
Anti-litter Campaigns	*
Construction of playground furniture	*

The present research found that the positive attitude towards Eco Schools by LA personnel is related to several perceived strengths. For example:

- Its seven elements bring together many important issues that are affecting the environment.
- It is used to piggyback other programmes and published materials, and it allows other programmes to be done and added towards its own Awards. For example there is a real possibility that the Traffic First Pack the Aberdeen Environment Centre is having problems convincing schools to take up will be bought much faster once schools are convinced that they can use it towards obtaining their Eco Schools Award.
- It can be used to deliver Citizenship and Biodiversity Action Plans.

Glasgow's Biodiversity Awareness Strategy sees Eco Schools as possibly the best channel for biodiversity education and awareness within the formal education sector, encouraging school grounds biological audits, and the production and implementation of school Biodiversity Action Plans (Glasgow City Council, 2002, p. 11). Council staff interviewed believe that delivering Eco Schools will meet Agenda 21 and Biodiversity requirements within the curriculum.

To give incentives to schools to take up Eco Schools, councils are tying any funding for EE activities to the school registering and pursuing all seven aspects of the Eco Schools Scheme.

Although the two Scottish case study schools presented in the present study are both Eco Schools, I have not undertaken a detailed analysis of the impact of the Eco Schools programmes in each school. This is because it is a programme of '*badge-ing*' activities that are already taking place in the school, and does not create any new activities.

MATERIALS PRODUCTION

Amongst others the RSPB, Aberdeen Environmental Centre and the WWF produce materials for schools. As programmes should be based in the curriculum, such materials should fit in accordingly at the level at which they are aimed. Organisations

sponsoring materials production are often those for whom such production is in line with their own remit. For example, both The Royal Northern Countryside Society and The Royal Highland Education Trust have a remit to educate about the countryside. They sponsored the production of *Experiencing farming, food production and the countryside* (The Royal Northern Countryside Initiative, 2000), a handbook for teachers and educators aimed at raising their awareness of the potential of taking pupils into the countryside, and in particular on a farm visit.

PILOT PROJECTS

Various pilot programmes are going on in Scotland. One is the Sustainable Secondary Schools Programme (SSSP). Details regarding this programme are given under the description of the Currie Community High School case study. Another is WWF's Scotland's Global Footprint Project (WWF, 2004).

This three-year WWF project with LAs in the North East (Aberdeen City and Aberdeenshire) and North Lanarkshire aims to transform the way people live and work in these LA areas in order to reduce their environmental impact. As part of the overall partnership project it will explore the ways in which schools can examine, measure and reduce their impact on the environment locally and globally. The programme will produce, in collaboration with schools in participating LAs, an interactive software tool, teaching materials and training which will provide an interactive method for upper primary and secondary schools (S1/2) throughout Scotland to calculate their 'footprint' at a whole-school level. The software materials and associated training will also help schools to develop strategies for reducing their schools' 'footprint'. The materials will then be shared with schools in all Scottish LAs. The project is being developed in conjunction with Eco Schools. The materials will support Education for Citizenship and the Eco Schools programme and show clear relevance to several Scottish curriculum areas/modes (e.g. language, mathematics, ICT, Social and environmental studies, scientific studies and technology) (WWF, 2004). The piloting of this project took place in the school year of 2004/2005. The Scottish Executive, Scottish Power, SNH, Scottish Environment Protection Agency and Eco Schools Scotland support the programme (The Royal Northern Countryside Initiative, 2000, p.54).

Schools apply or volunteer to pilot these programmes. Once piloting is complete successful processes and materials are 'rolled out' to schools in all other Scottish LAs.

SCHOOL GROUND DEVELOPMENTS

There are organisations in Scotland that are dedicated to supporting schools undertake school ground developments for aesthetic, personal and social development as well as teaching and learning purposes. After Eco Schools theirs are the second most mentioned EE activities taking place in Scotland. Scottish Natural Heritage and the charity Grounds for Learning are two such organisation. Councils sometimes match funding received by schools from these organisations. Apart from these nationwide programmes most EE activities tend to be specific to certain local areas. Completed questionnaires from the national survey of EE in Scotland reveal that different LAs have unique EE programmes they have created for their schools which are specific to particular geographical areas. These are programmes such as the RSPB Project with Island Schools, 'Farm Links' and 'Clyde in the Classroom'. Follow-up face-to-face interviews and the case study of the Renfrewshire P5 Environmental Education Programme revealed that some LAs have outdoor centres and may have in place a policy that all schools visit these, with each school allocated a slot each year for the visit for particular class.

FUNDING OF PROGRAMMES

Follow-up face-to-face interviews of key informants during the national survey elicited information regarding the sources of funding for EE programmes running in various LAs. This section summarises the findings. If an EE programme is part of the council's development plan and thereby part of the school's development plan, then the council gives schools resources to divide up in terms of their priorities. Councils may receive money from the Landfill Tax Credit Scheme (LTCS) to support environmental initiatives.

The LTCS was introduced with the Landfill Tax in October 1996. It enables landfill operators to donate up to 6.8% of their landfill tax liability to environmental projects run by Environmental Bodies (EBs) in return for a 90% tax credit. The LTCS was designed to help mitigate the effects of landfill upon local communities. Designed

with partnership in mind, the LTCS brings together landfill operators (LOs), their local communities and the voluntary and public sectors (LTCS, 2005).

Apart from the LTCS a number of environmental bodies receive money from the government in various ways to meet particular agendas. They approach schools and offer support for particular activities. Quite often the support they offer is a time/human resource rather than financial (Primary Advisor, City Council A, personal communication, March 17, 2004). LAs sometimes apply for money from the National Lottery to match donations by EBs. Funding from these sources in some councils is not given directly to schools. It is used to establish a support infrastructure of advisors. These are people who go to schools to give support and develop individual school programmes marketing strategies. Marketing strategies could include the establishment of a website. The duty of giving money directly to the schools is perceived as the duty of the council (External Funding Officer, City Council D, personal communication, March 30, 2004).

Money for Local Agenda 21 is given to LAs from the government. LAs then divide this among their departments. Some LEAs divide their Local Agenda 21 allocation between schools. They give guidance on the kind of projects the money should be spent on. Schools then decide what projects to do to meet the criteria set by the LEA (Quality Improvement Officer, City Council E, personal communication, March 12, 2004).

Individual schools also have their own budget. If it wishes, a school could identify part of this budget for use on EE activities. Further, schools sometimes generate funds for their activities from the Parents and Teachers Association (PTA). Money from the Scottish Executive Quality of Life Fund, as well as from the Scottish Book Trust (Scotland's national charity for reading and writing) has funded EE activities in schools. In general schools source funding for their programmes from anywhere they can. This includes local businesses.

Different schools in each LA may run different programmes. They are often faced with a menu of activities they could do. The appropriateness of an EE programme may be dependent on the location of the school. While schools may be doing the

same scheme of EE activities, the school and the teachers who are taking it forward often address local priorities and issues.

The ability and willingness of schools to make the commitment these programmes require depends a lot on teachers and the headteacher's enthusiasm and willingness to be involved (Headteacher, A Primary in Scotland, personal communication, March 25, 2004), and therefore the degree to which the programmes are adopted will be variable. What follows is a presentation of the two Scottish case study schools.

As was explained in p.107 codified procedures available for drawing programme theory provided a predetermined framework of data collection and acted as a preliminary data analysis framework. The various elements that constitute programme theory (see Figure 3.1) guided the report on individual EE programmes at each case study school, taming contextual complexity. The temporal sequencing of components making up the impact theories of individual EE programmes as well as the linear logic models (see Appendix III - VI) are used as valuable analytical tools that highlight important issues regarding individual EE programmes and allows their ease of study.

5 THE SCOTTISH CASE STUDIES

CASE STUDY 1: INVERARAY PRIMARY SCHOOL

INTRODUCTION

Inveraray Primary School is a small rural school in the ancient Royal Borough of Inveraray in Argyll, Scotland. Inveraray is a tourist town and attracts many visitors. The school was built in the early '60s as a primary and junior secondary school. In the late '70s the secondary department was closed, leaving spare room in the building. The spare accommodation has been developed into a centre for in-service training of teachers. As part of the training centre there is a computer suite where the intranet for Argyll and Bute schools is run from. The school enjoys close links with the training centre and the headteacher has been involved in delivery of in-service training. In the past seven years a pre-5 unit has been developed and this now sits comfortably within the establishment. Thus as an establishment Inveraray offers education from 3-12 years and a training base for teachers.

The pupil population for both the pre-5 and the primary school is below 100, 70 in the primary school section, and approximately 20 in pre-5. The school has 4.3 full-time teaching staff, two pre-5 workers, two Special Educational Needs auxiliary staff, a part time classroom assistant, janitor, and an auxiliary/clerical assistant, catering staff and cleaning staff.

When the headteacher arrived at the school, seven years ago, she knew there were large grounds at the school and she was eager to develop and make use to them. The first opportunities for pupils to go out into the school grounds were 'one-offs'. They were not part of programmes that were embedded into the curriculum. Outdoor activities began with events like the School Grounds Week, and the Annual Tree Dressing Event. These were used to get the children outdoors and getting them to enjoy their environment. The staff and pupils enjoyed these so much that staff began to look at how they could extend these activities, building them into the core-curriculum so as to get the best of both worlds.

The Tree Dressing Day takes place annually on the first weekend of December. At this time trees are really bare. The purpose of the event is to raise an awareness in staff and pupils that the 'the trees are really there' and remain beneficial to everyone, even when they are bare with no leaves on them. The school staff and pupils creatively make things to hang onto the trees according to various issues relating to the tree. These may be issues to do with the tree's history or function.

Because the school had already done some work and made significant inroads in environmental education in the outdoors, the headteacher of Inveraray Primary School was invited to be part of the working party of three that developed the Curriculum Paper and Policy for Education for Sustainable Development for the Argyll & Bute Education Service between December 2001 and March 2002. This policy document defines the purpose of environmental education as being to:

"Equip people with the skills, knowledge and understanding to help them to take better informed decisions, whether corporately on behalf of others or individually in their own lives, and to act in ways which are consistent with a sustainable future."

(Scottish Office, 1999)

The policy is rooted in Agenda 21 and the Argyll and Bute Local Biodiversity Action Plan that emphasises the need to promote understanding and raise awareness of the local environment. This plan was made available to all school in the local authority, to be used in curriculum areas.

The policy endorses recent SEED documents that highlight the need for ESD to permeate the whole curriculum, and urges that SD be placed at the core of school life - not as a subject in itself or equated with Environmental Studies (ES), but permeating everything the school does. Elements of ESD would already be present in the curriculum as integral parts of existing topics within ES. Education for Sustainable Development was to be incorporated into all areas of the curriculum in a relevant and meaningful way. It is seen as a teaching and learning approach, and consideration given to possibilities for its inclusion when planning programmes of study (Paterson, Petty & Armour, 2004).

The policy further advocates diversity in approach to the inclusion of ESD depending on each school establishment's needs, resources, and interests, both in addressing local and global issues of sustainability. It identifies the goal of EE and ESD as:

To provide an education that is concerned with forming positive attitudes to the environment and equipping young people with the knowledge and skills they will need to care for our world. Environmental and Sustainable Education should be seen as part of an all round education for life and permeate throughout the curriculum (Paterson et al., 2004).

Each school in Argyll and Bute was encouraged to have a policy on ESD and a proforma was provided guiding the wording of it for consistency with the LEA's policy on the subject. Inveraray Primary School has a school policy on EE and EfS. Formal resources such as reading schemes have been selected in order to complement this 'environmental approach' to the curriculum.



Plate 3 A school poster that summarises Inveraray Primary School's EE programmes.

Inveraray Primary School has a whole school 'School Grounds Project' which was launched in September 2001. Plate 3 shows a school poster summarising activities taking place in the school grounds. From November 2001 the school took part in the GfL sponsored 'Learning Outside Inside' Action Research Curriculum Project. This

project focused on maths teaching and learning in the school grounds. From 2001 to 2003 the school also took part in an arts competition entitled 'The Sky Above The Earth Below'. There are also EE programmes that are an integral part of classroom teaching and learning activities. In line with the school and Argyll and Bute's policy on the subject, these topics permeate the whole curriculum at the level at which they are taught. Although minor variations occur from session to session the topics outlined and investigated in this study are fairly representative of the principles behind the school's pursuit of them. These are the 'Minibeasts' topic for the Primary 1 and 2 composite class (P1/P2), the 'Rubbish and Recycling' topic for the Primary 3s, the 'Butterflies' topic for the Primary 4 and 5 composite class (P4/5) and the 'Planet.com' topic for the Primary 6 and 7 composite class (P6/7) which looks at rich and poor countries.

For the purpose of this research I interviewed the headteacher of Inveraray twice. The first interview was during the Scottish national survey. For this she was wearing two hats. The first hat was that of representative of the Argyll and Bute LEA, and the second as the headteacher of Inveraray Primary School. The second interview was after the selection of Inveraray Primary as a case study school. The focus of this interview was to get an overview of EE programmes running in the school and specifically dwelt on the documentation available on them that could be informative for this research. I carried out four lesson observations one for each of the four classes in the school and interviewed each of the four class teachers responsible. I used my standard Document Request Form (see p.413) to request appropriate programme documentation. A list of documents used to verify and complement interview and observation may be found in Appendix IV.

Information contained in these documents was analysed to describe important predetermined aspects of individual EE programmes that constitute a linear logic model (See Chapter 3). Linear logic models drawn for EE programmes at Inveraray Primary, as well as their resources and prior functions, may be found in Appendix III. For programmes that were organisationally separate from day to day teaching and learning activities Impact Theories were drawn from those sections of the linear logic model that deal with immediate/proximal, intermediate and long term outcomes. Specifically addressed at Inveraray Primary are the 'Learning Outside Inside' Action Research Curriculum Project and The Sky Above The Earth Below Competition. However, true to its policy on the subject, the ESD programme at Inveraray Primary is not seen as a separate subject, but an attempt is made to incorporate it into all areas of the curriculum in ways that are relevant and meaningful. Consequently, apart from the 'Learning Outside Inside' Action Research Curriculum Project, and The Sky Above The Earth Below Competition, in general EE programmes cannot be identified separately from the core curriculum. For such integrated

programmes I found it difficult to draw the logic of their impact theories. I have found this to be true in general for school teaching and learning activities that do not have a distinct organisational structure separate from everyday classroom teaching and learning. Teachers will not claim that simply because pupils are informed and thus know about aspects of the environment and related problems, this would lead to attitude changes which would in turn lead to certain behaviours. Ramsey and Rickson's (1977) linear model of changing behaviour that states that, "increased knowledge leads to favourable attitudes...which in turn leads to action promoting better environmental quality" is unsupported by empirical evidence, and so the teachers' caution in avoiding such claims seems wise. Consequently proposed outcomes such as knowledge, attitudes, values, and behaviour could not be separated into a linear logic model. As I did in the case of the Renfrewshire case study, I put the outcomes of such integrated activities into the model of predictors of environmental citizenship behaviours proposed by Hungerford and Volk (1990). The results are displayed in the two behaviour flowcharts (see **Figure 5.1** and

Figure 5.2) that show the outcomes of the *Minibeasts*, *Rubbish and Recycling*, *Butterflies*, and *Planet.com* programmes against predictors of environmental citizenship

The School Grounds Project

In 2001 Inveraray Primary School changed the format of its school day. The afternoon interval was removed. There was therefore no break for pupils in the afternoons. As a result of this the staff at the school were keen to develop learning activities that took pupils outside during the afternoons. The school began by having story time, environmental games, art activities, environmental tasks, science activities and PE outside as part of the afternoon's teaching and learning activities. Staff and pupils welcomed this and pupil behaviour in the afternoon improved greatly. It was against this background, supported by a considerable commitment to EE, that the headteacher approached SNH for assistance to develop the school grounds for teaching purposes and play.

Prior to the work at Inveraray Primary SNH received very few School Grounds Grant applications were being received by SNH from Argyll and Bute. The ones that were received were poorly presented, with a concentration on aesthetic improvements and no pupil involvement (SNH Area Officer for Argyll and Bute, personal communication, April 29, 2004). Thus when the headteacher of Inveraray Primary approached SNH intending to do something about the expansive grassy school grounds the Area Officer for Argyll and Bute and SNH saw this as an ideal opportunity to demonstrate their ideals for school grounds development. The school is ideal for this purpose as it is centrally located, has large grounds, and has a teacher

Training Centre on site. The enthusiasm of the headteacher was key to the selection of the school as a demonstration site. The school received a large grant from the SNH. Its activities would demonstrate to other schools what can be done in the school grounds and what SNH will fund.

The school worked in partnership with SNH and GfL on a whole school project on school grounds, during session 2001/2002. The school, in partnership with SNH, decided to work on using the school's extensive grassy grounds (See Plate 4 and Plate 5) in a project to redesign different areas and make the environment more interesting. They planned to create various habitat areas, for instance bog, hedgerow, heather, wildflower area, apple orchard, and a mountain area. This stemmed from a keenness to establish various habitats associated with Scotland. These would then be incorporated into the curriculum. There was a plan also to build willow dens and add log piles and various other areas that would make the grounds more interesting for the children at playtime. Seating would also be developed to allow the children to have time to sit and look at what was around them in their environment.

In 2003 Inveraray Primary School was awarded the Eco Schools Green Flag and the headteacher has been awarded the Biodiversity Award for Argyll and Bute for her work through Inveraray Primary School.



Plate 4 Inveraray Primary School grounds.



Plate 5 Inveraray Primary School grounds.

As a result of its success, GfL and SNH use Inveraray Primary for in-service training of staff. Surrounding Education Councils and Argyll and Bute also use the school for Continuous Professional Development (CPD) in school grounds development for teachers. The use of the school as a demonstration site has resulted in an increase in SNH School Grounds Grant Applications (Fergus Younger, Area officer, SNH – Argyll and Bute, personal communication, April 29, 2004).

Minibeasts

The Minibeasts topic is done by the P1/2 composite class. The term ‘minibeasts’ refers to any of the vast range of tiny animals that children may find in their environment. It refers to invertebrates (no internal skeleton) (Coltman, Peacock and Richardson, 1997, p. 159). This topic is very much part of the core curriculum at Inveraray for the P1/2 composite infant class. The topic links to all the other aspects of the curriculum at this level. These are Environmental Studies, Religious and Moral Education, Expressive Arts, English and Mathematics (Kidd, n.d).

This topic looks at insects that are found in the school grounds and further afield. It involves the children in collecting insects, counting, identifying and classifying them before releasing them back into their own habitat. The information is used to build a picture of the minibeasts that may be found in the school grounds. These data are used to extend the use of spreadsheets and graphs as well as building up a database of information about each creature (L. Kidd, P1/2 classroom teacher, personal communication, April 26, 2004).

Rubbish and Recycling

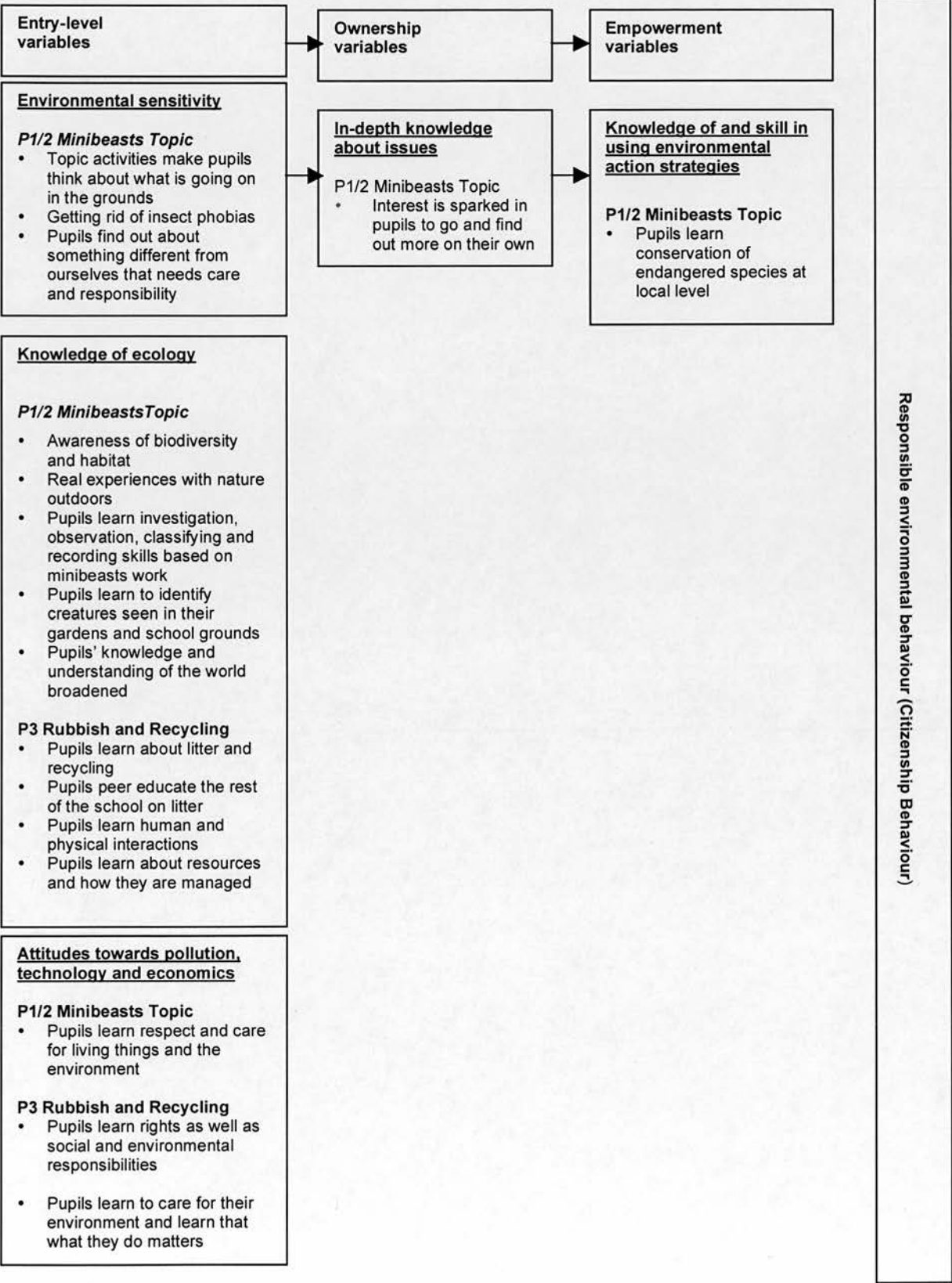
This topic done by P3s at Inveraray Primary School is a study of rubbish in the school, homes and the community and encourages children to take action to identify rights and responsibilities to protect the environment (L. Leyland, P3 class teacher, personal communication, April 26, 2004). It is very much part of the core curriculum and involves forays into the school grounds to carry out activities related to litter. The teacher enjoys being outside and seeing the children responding to the environment

Further details of the activities involved under this topic and the ‘Minibeasts’ topic are outlined in the topics’ Linear Logic model located in Appendix III.

Figure 5.1 below is an outline of the development of predictors of Environmental Citizenship Behaviour using the Hungerford and Volk (1990) Model through the 'Minibeast' and the 'Rubbish and Recycling' topics.

Figure 5.1 Behaviour Flow Chart: Variables involved in Environmental Citizenship Behaviour – Minibeasts, Rubbish and Recycling Topics.

(Adapted from Hungerford & Volk, 1990) See Linear Logic Model (p.420) for the data sources of individual entries.



Butterflies

This Butterfly topic or project was developed to encourage use of the school grounds for teaching, while also meeting the requirements of the 5-14 Curriculum Guidelines. The P4/5 composite class does this topic and project during the summer term. It is part of the Living Things and Processes of Life section of the Science component of the syllabus. This is a section of the syllabus that looks at characteristics of insects, their lifecycles and how pupils can help their local environment conserve them (K. Norris, P4/5 class teacher, personal communication, April 29, 2004).

A key teaching resource is the Butterfly Garden. This consists of a butterfly net, flung over a small tree and some twigs. The teacher then puts in butterfly eggs that are ordered from a private company. The pupils have the opportunity to observe close-up the eggs hatching into caterpillars, and caterpillars transforming into butterflies. Eventually pupils release the butterflies. Work on the Butterfly Project tends to be done in the afternoon when pupil concentration tends to be low within the classroom (K. Norris, P4/5 class teacher, personal communication, April 29, 2004).

The teacher does not formally evaluate the project at the end but at the end of each lesson does a quick mental evaluation of how the session went, how the pupils benefited and how the experience can be improved (K. Norris, P4/5 class teacher, personal communication, April 29, 2004). The evaluation procedure in this case is to inform the teacher's own practice. The headteacher also gives feedback on aspects of the project that she observes.

Further details of the activities involved under this topic are outlined in the topic's Linear Logic Model located in Appendix III (p.426).

Planet.com

This topic, done by the P6/7 composite class, looks at Food and Farming (BBC Channel 4 Television, planet.com programme 5) and Rich World/Poor World (BBC, Channel 4 Television, planet.com programme 7). The main messages under Food and Farming are:

There is sufficient food to feed the world adequately – but it is unfairly distributed.

There is little incentive for the rich nations to eliminate hunger and starvation. Severe weather and war cause hunger and starvation (BBC Channel 4 Television, planet.com programme 5).

The main messages under Rich World/Poor World are:

The world's resources are distributed very unequally.

The developed world has more than enough resources while the majority of the world has not enough.

Through debt and under-investment, the developed world retains control.

Unless ways are found of sharing resources more fairly, poorer countries may find violent ways of making their demands known.

(BBC, Channel 4 Television, planet.com programme 7)

Further details of the activities involved under this topic are outlined in the topic's Linear Logic Model located in Appendix III. Figure 5.2 is an outline of the development of predictors of environmental citizenship behaviour through the Butterflies and Planet.com themes according to the Hungerford and Volk (1990) Model. Plate 6 and Plate 7 shows P7 pupils during a Planet.com lesson.



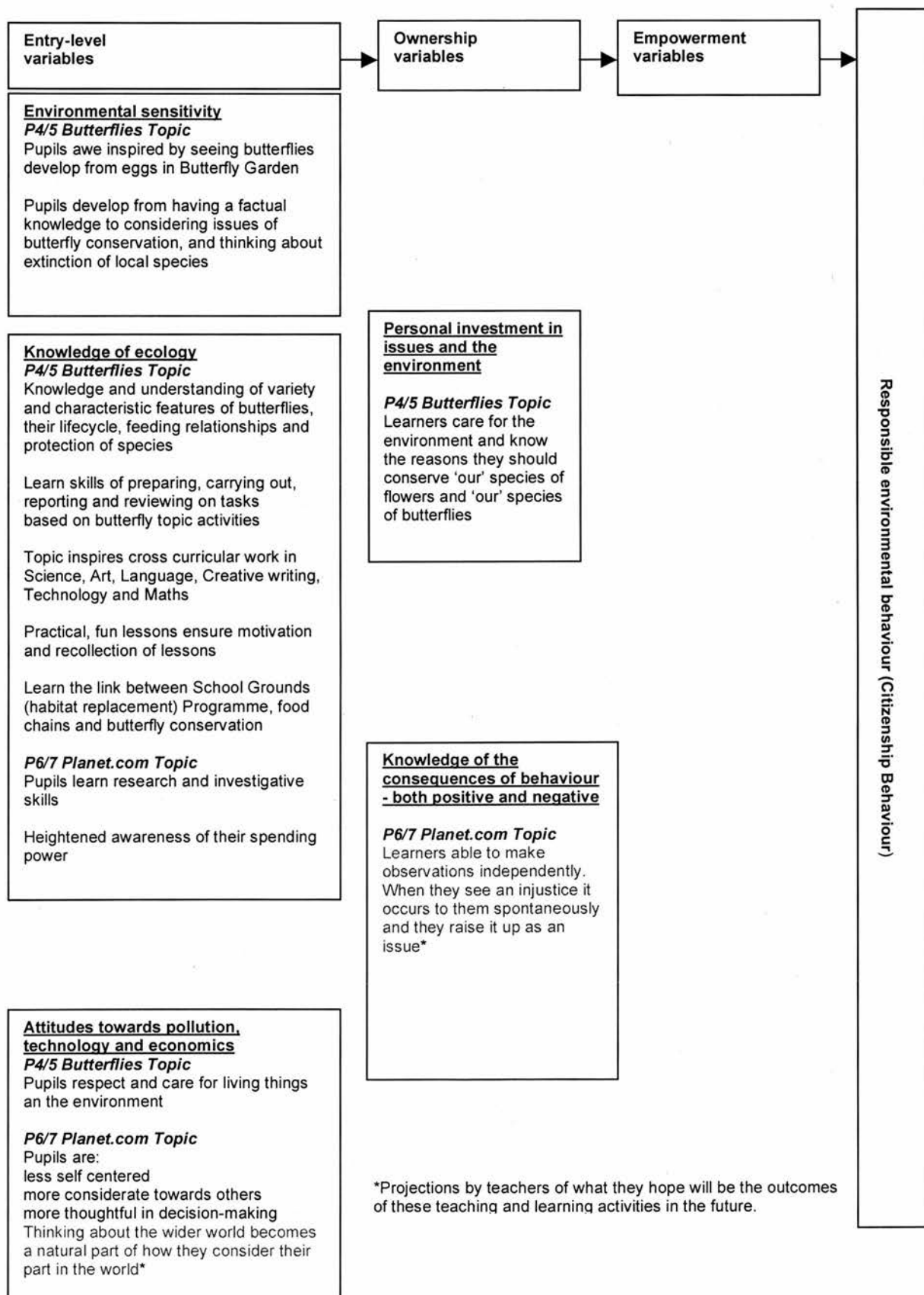
Plate 6 P7 pupils working on the Planet.com Topic.



Plate 7 P7 pupils working on the Planet.com Topic.

Figure 5.2 Behaviour Flow Chart: Variables involved in Environmental Citizenship Behaviour – Butterflies, and Planet.com Topics.

(Adapted from Hungerford & Volk, 1990). See Linear Logic Model (p.429) for the data sources of individual entries.



The Sky Above, The Earth Below Competition

Programme organisational plan and prior functions

The Sky Above, The Earth Below competition (2001-2003) invited entries from nursery and primary schools throughout Scotland to submit a design for a permanent piece of playground art inspired by their outdoor environment. This GfL project was designed to help young people discover how the outdoors, and their school grounds in particular can offer a variety of artistic opportunities (GfL, 2002). The competition was supported by sponsorship from Scottish Arts Council Lottery Funds and Amerada Hess Ltd. The project encouraged children to focus on their local area, exploring what is distinctive about the school's neighbourhood, town or region of Scotland.

Grounds for Learning advertised the competition on their website as well as in other media. Interested schools registered and were sent useful literature containing ideas for the schools and other relevant information. Schools then worked to submit their design for a piece of permanent art for their playground. Out of over seventy varied designs from across Scotland, nine winning entries were chosen (GfL, 2003).

Assumptions underlying the programme are that Expressive Arts are not just about products but are a series of processes through which we make sense of the world in a way that is not possible through alone. These processes of course will often have outcomes in the form of artefacts, paintings or performances. Other outcomes are less obvious but equally valuable. The important thing is that pupils understand a sense of purpose in their activities and begin to appreciate how some of these experiences can fire their imagination – the first important step to releasing creative potential (GfL, 2002).

For two terms before the school registered for the competition, P4-7 classes at Inveraray Primary had been working with a local artist, who was employed on a Classroom Assistant basis for one day a week. As a result the children had created a batik hanging of flowers that occur throughout the year, used willow covered with tissue to make butterflies, worked with clay to produce tiles and had used a variety of techniques in frieze work. The artwork had also been linked into musical activities where sound stories were produced. The butterfly tiles were to be mounted out in the

school grounds the following term when the butterfly area was created. This work related to butterflies stimulated the children to the idea of having some mosaic to identify each area of the grounds and a variety of creatures were suggested (Paterson, 2003b). Thus when pupils were encouraged to use the knowledge gained in the School Grounds Project to think of how the school could incorporate a piece of expressive arts work into the project for the Sky Above, The Earth Below Competition, the pupils in P4-P7 suggested that the school create mosaics of approximately four or five animals to form a nature information trail around the school grounds. All suggestions received were put to the vote and the suggestion of P4-7 won the most votes (Paterson, 2003b).

The project required the input from artists to create with the children the mosaics as well as to fire and suitably glaze the mosaics for outside use. Within the School Grounds Project pupils and staff were very keen to incorporate the various habitats of Scotland and as such the creatures for the mosaics would be Scottish wildlife. They were also very keen to include those they had seen in their own grounds to date or those they hoped to encourage due to their habitat replacement work. The mosaics would be made from clay and be textured to reflect skin, fur and so on.

The school went on to complete the application form for this creative competition. This included their design of the permanent art pieces they wanted to put up. As many of the pupils' own words as possible/practicable were included in the application. This was because the children's own creative ideas were of paramount importance, and in judging the entries the organisers looked for evidence that this was the case. Staff and other adults' role was to stimulate pupils' imagination, helping them develop and display their ideas, not imposing their own (GfL, 2002).

Inveraray Primary School was among the nine schools that won the arts competition, resulting in a contract for eight days worth of a professional artists time, as well as £500 for materials to turn the school's proposal into permanent features in the school.

The artist helped the pupils to select the animals for the murals:
Fox (to be placed under a tree in the grounds)

Seagull (to be located in the playground as real seagulls always visit the grounds after playtime for the rich pickings)

Spider and Fly (on the side of the shelter shed next to the new log piles)

Toad (next to the pond)

Adder (in the heather patch in the grounds)

(Paterson, 2003b).

The first thing the artist did was to cast the mould of each of the animals in concrete and then transport them to the school grounds. This part of the process was carried out without the children's help. When the concrete shapes of the animals arrived in the grounds the pupils really become involved and long discussions took place about the actual site of each creature. They had to get it right as the children appreciated that the moulds were very heavy and once in place they couldn't be moved easily.

The first creature was the adder (see Plate 9) and work began on it in May. The children were very excited and delighted to begin this work (Paterson, 2003b). The next area to be developed was the Spider and Fly based around the poem "Come into my parlour said the Spider to the Fly". Interest in the Minibeast topic that the infants were involved in during the summer term and the need to progress the mosaics during two weeks of solid rain resulted in developing mosaic tiles based on 'minibeasts'. These could be made in the classroom. The completed tiles were placed out on the shelter-shed walls in the playground. This placed them next to the spider and fly and enhanced this part of the development (See Plate 10). This part of the project was not initially in the plan but was an excellent way to keep the project going and allowing the P1/2 pupils to get involved as they found it more difficult to work on the larger mosaics for long (Paterson, 2003b).

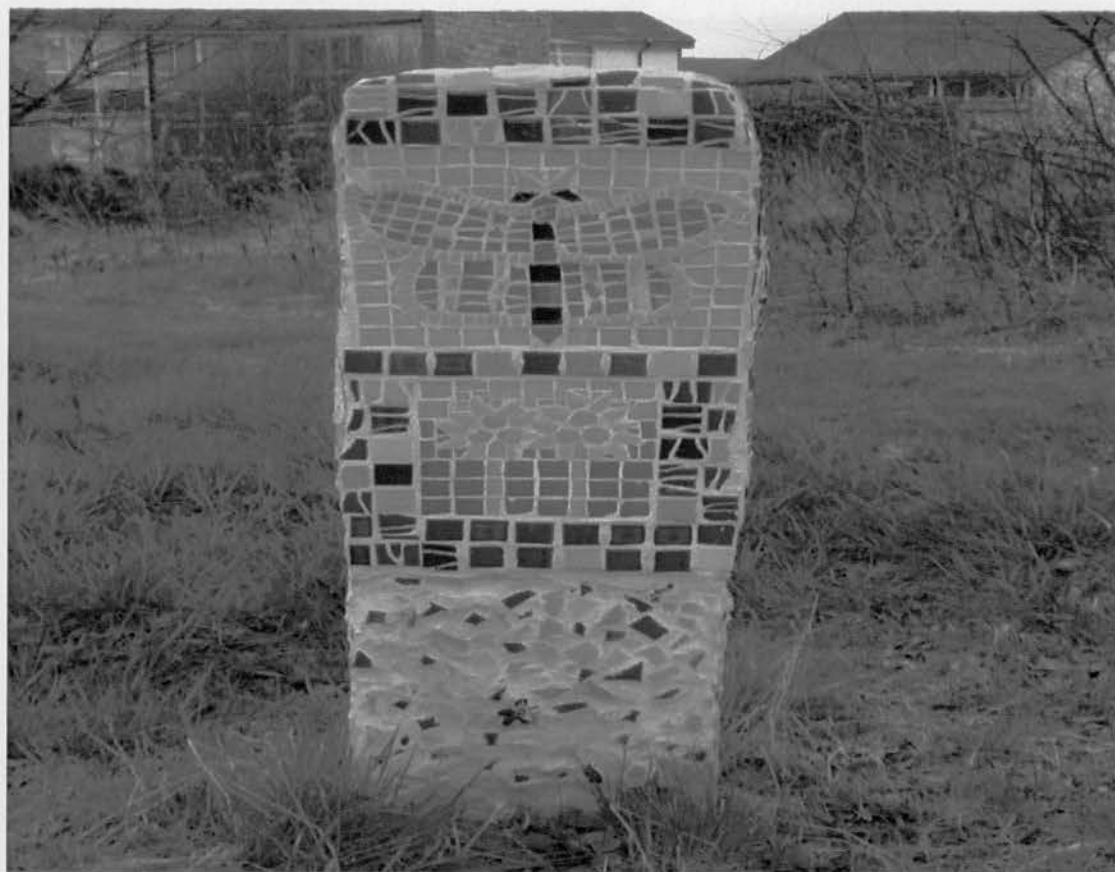


Plate 8 **Mounted butterfly tiles.**



Plate 9 **The Adder.**



Plate 10 The spider and the fly.



Plate 11 The fox

P4/5 had each made a butterfly clay tile that was fired and painted and the artist made concrete pillars that the tiles were set on and placed out in the area which was

to become the Butterfly Garden (See Plate 8). This was part of the P4/5 topic on butterflies. The pillars were erected in the grounds prior to the summer holidays.

As the school left for summer break at the beginning of July there was still work to be undertaken on the seagull, fox (see Plate 11) and toad. It was arranged that any pupils who wished to be involved during the holidays add their name to a list and the headteacher would phone around when she had a suitable date. Towards the end of July there were two glorious days of sun and a very willing workforce of 20 children, six parents, two members of staff and the artist. They had a really good working time with parents searching in their sheds for some more paint to paint the outside of the shelter shed to show off the mosaic tiles to best advantage (Paterson, 2003b).

The school had initially hoped to have an interpretive board for the whole School Grounds Project but after seeing the mosaics in place they quickly realised that the mosaics were placed in the correct positions allowing them to be an interpretive element.

The mosaics were a very special welcome back to the school after the summer break. staff decided to use the new interest and excitement as a learning experience. Consequently the mosaics were used as the resource for all school writing for August. Primary 1/2 used the mosaics as the source for functional writing and wrote about the habitats the real animals would live in and what they would need to survive. Primary 3 used the mosaics for poetry writing. Primary 4/5 let their creative elements loose when they wrote imaginative stories about the mosaics coming to life when the school was empty at night. Primary 6/7 took on the reporter role and wrote articles for the 'School Squeak' newspaper they were working on. The animals are also a regular part of adventures during play (Paterson, 2003b).

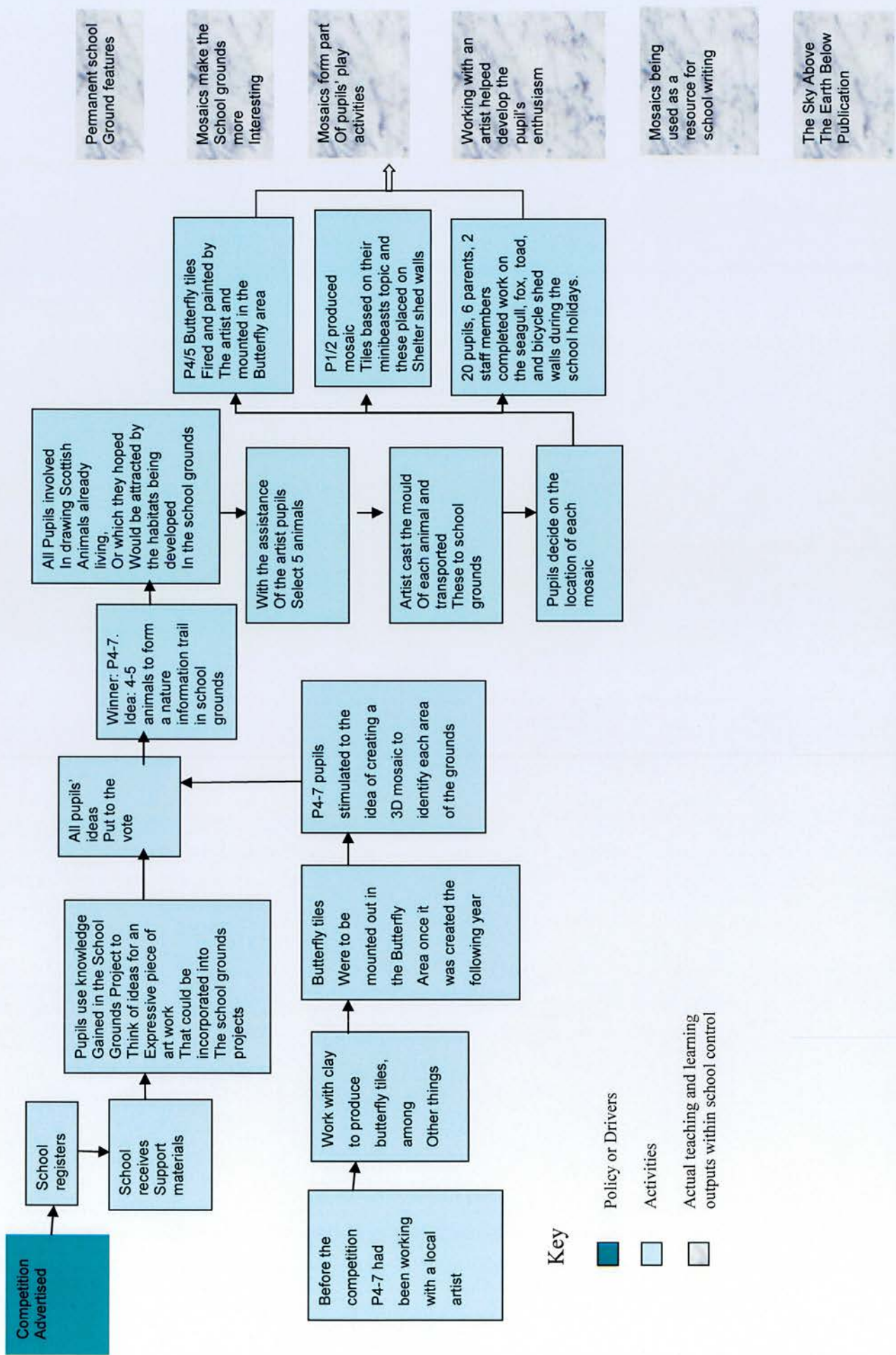
Grounds for Learning staff visited the school to see that the pieces were completed and installed to a satisfactory standard, and since all parts of the agreement had been fulfilled to GfL's satisfaction they approved the payment of the approximately £500 materials budget. The school provided at least two sides of A3 showing the project developing through a series of photographs taken throughout the work, showing both the 'piece' development, and the children and artist working together on its creation. The school also provided GfL with a project report (Paterson, 2003b) outlining the

process undertaken through to completion of the artwork. To help refine this project for the future GfL asked each school to fill in at least one evaluation form, and requested further informal feedback when they required it.

The school arranged with GfL any press or other publicity work. A range of examples of the creative ideas schools produced for this competition was published in the publication, *The Sky Above, The Earth Below* (GfL, 2003). This was reproduced and made available to schools throughout the UK. This publication not only told the story about the project, but also gave practical ideas on the use of expressive arts in the environment. The case studies presented in the GfL publication are designed to show the great opportunities available to schools with some hard work and inspiration from pupils, staff and the local community. The practical activity for teachers can be adapted and used in any school with little or no cost and minimal organisation. The publication provides information on links to the Scottish 5-14 Curriculum Guidelines with each activity but with no particular age category specified, as the activities can be adapted to fit any level (GfL, 2003).

What follows is a presentation of the impact theory for The Sky Above, The Earth Below competition at Inveraray Primary School (Figure 5.3). As explained in p.107 the temporal sequencing of components in the impact theory is used in the present study as a valuable analytical tool highlighting important issues regarding the real and projected impact of the individual EE programmes. All impact theories drawn for EE programmes at Inveraray are the basis for the analysis of the summative impact of the school's EE programmes presented on p.158.

Figure 5.3 Inveraray Primary School The Sky Above The Earth Below Competition - Impact Theory



The Action Research project: Maths in the School Grounds, Improving Maths

The benefits seen in teaching curricular areas such as Environmental Studies, Science and Expressive Arts in the outdoor environment, with use made of habitat areas developed there, were felt to be so significant that the headteacher and staff at Inveraray Primary School were keen to formalise this approach as well as to test it in another curriculum area. Thus Inveraray Primary School saw this Action Research Programme as the vehicle for extending their work and allowing them the opportunity to have some external advice and review of the work they were undertaking (Paterson, 2003a).

Inveraray Primary school did this project as part of the GfL sponsored 'Learning Outside Inside' Action Research Curriculum Project. This project was designed to help GfL develop a set of 'curriculum materials' specially designed for the 3-5 and 5-14 curricular guidelines in Scotland, and to help teachers use school grounds in all sorts of ways for effective learning and teaching. These materials were to be produced from the viewpoint of teachers working in Scotland, with practical suggestions for lessons and projects, showing how almost all aspects of the curriculum can be delivered using the 'outside', including and beyond the more obvious opportunities in environmental studies. Grounds for Learning recruited 10 schools, including Inveraray Primary school to help them develop and test these materials to show the opportunities for teaching the range of Scottish curriculum topics in, and through the school grounds and the outdoor environment. The project offered guidance, advice, materials, and information to help each school with its own particular project over the six-month project phase. Grounds for Learning personnel make at least two visits to each school during the project period, to stimulate and help with the project. A financial contribution was made to participating schools to enable the release of teachers for a couple of in-service training and development days (Paterson, 2003a).

In summary GfL helped the school develop and carry out as many curriculum activities as they wanted or needed to, using, working in, or reconnecting to the natural world outside the classroom. Grounds for Learning would then use these projects as examples in suggesting ways of working, and ideas to help other teachers in Scotland do similar activities (Paterson, 2003a).

The initial meeting for the Action Research Project took place in November 2001. The first lessons around this contextual learning opportunity took place in February 2002. The School Grounds Project for developing the school grounds, which the school had embarked on in 2001/2001 in partnership with the SNH, had given staff an opportunity to take a fresh look at topics and how they could involve maths in some of the developments. As a result, school grounds developments presented many opportunities for making the pupils aware that maths is “real”. Pupils saw that in many of their school grounds development activities they often needed to use a variety of processes, e.g. comparing, finding the difference, adding, subtracting, multiplying, and dividing. A lot of the activities involved a need to cost developments. Data handling activities were very realistic and this has been very motivating to the pupils (Paterson, 2003a). These results are consistent with recommendations and findings by GfL:

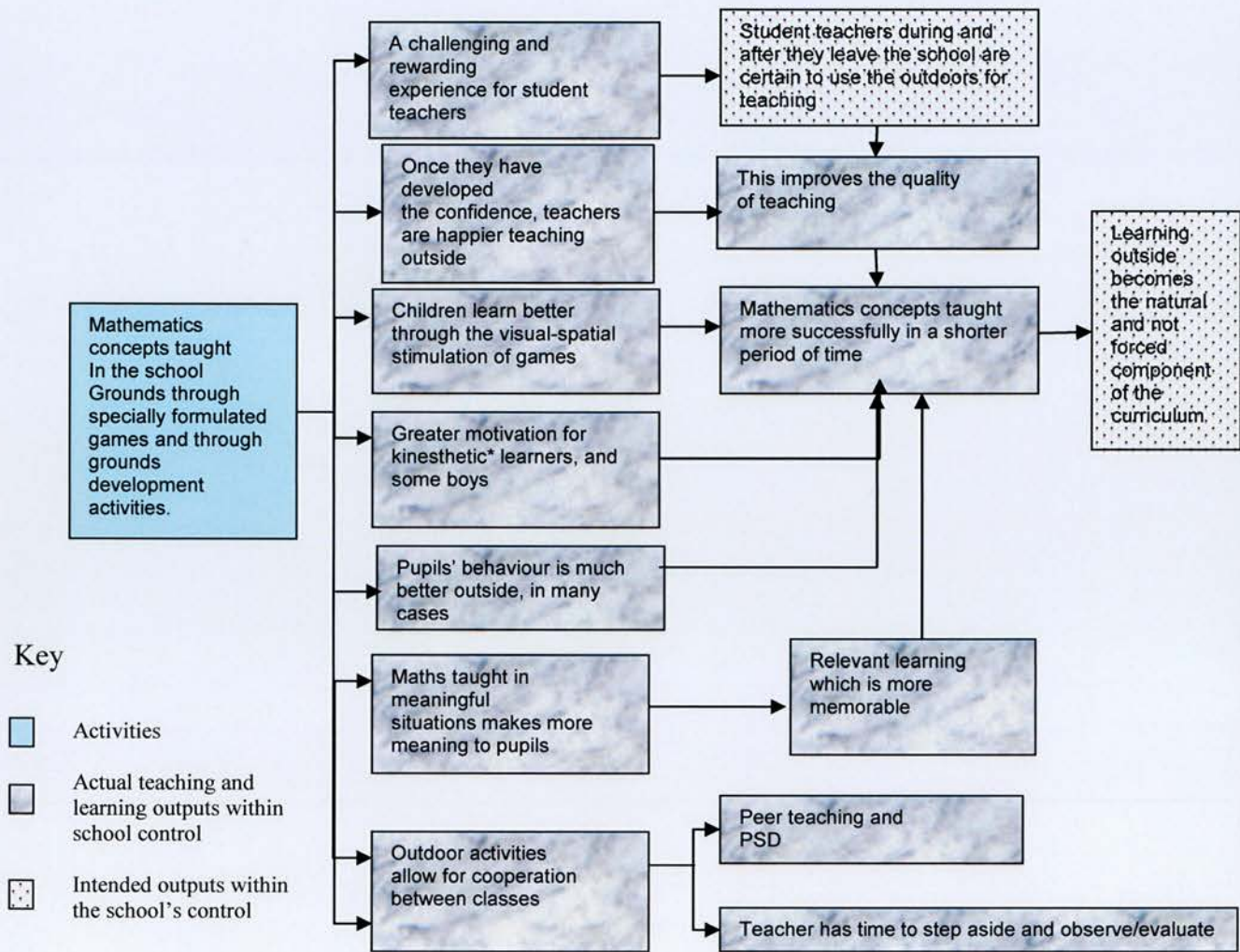
“Involving your pupils in improving your grounds offers infinite scope for mathematical activities covering all five strands of the Numeracy Strategy Framework”

(GfL and Learning through Landscapes, Numeracy in your school grounds)

As a result of the Action research project, the staff had an opportunity to move from lesson planners based on Heinemann Maths on which the Argyll and Bute maths programme is based, to teaching maths in context and also to a focus on pupils learning styles (Paterson, 2003a).

The linear logic model for this project may be found in Appendix III while the programme’s impact theory is presented in Figure 5.4.

Figure 5.4 Inveraray Primary School Maths in the School Grounds - Impact Theory



*Kinesthetic or tactile learners are 'doing' learners. They like movement and can concentrate best when they are active. They find it difficult to sit still for long periods of time, and are most successful when they can practice or do what they are learning.

Below is a description of the findings of this research regarding the case of Inveraray Primary School. They are divided into an analysis of the 'drivers' for the EE programmes at Inveraray Primary School which I have termed 'contextual imperatives for action' and an analysis of the impact theories of the EE programmes running in the school.

AN ANALYSIS OF CONTEXTUAL IMPERATIVES FOR ACTION

The policy imperative

The Revised National Guidelines for Environmental Studies 5-14 places a very strong emphasis on stewardship of the environment through the development of informed attitudes. As its rationale the Education for Sustainable Development Policy Statement for Argyll and Bute Council schools acknowledges that;

Education should be concerned with developing informed attitudes to the environment and equipping young people with the knowledge and skills they will need to care for the our world. Education for Sustainable Development should be part of an all round education for life and permeate throughout the curriculum. It should not be seen as a discrete aspect of Environmental Studies but go beyond this into all aspects of learning. It will be an integral part of the development of citizenship in our schools and communities (Paterson et al., 2004).

The Aims of ESD for all Argyll and Bute Council schools are:

To provide opportunities, in a cross-curricular approach, which encourage pupils to develop:

- A commitment to learning
- Respect and care for self and others
- Social and environmental responsibilities
- An awareness of a sustainable lifestyle

(Paterson et al., 2004).

School imperatives

A change in the format of Inveraray Primary's school day in 2002 resulted in the removal of afternoon break for pupils (the headteacher did not give details about the

reason for this change). As a result pupils become restless in the classrooms and behaviour deteriorates (A. Paterson, personal communication, April 27, 2004). Consequently staff at the school were keen to develop learning activities that took pupils outside during the afternoons (A. Paterson, personal communication, April 27, 2004).

The headteacher and staff

The headteacher and staff enjoyed taking the children outdoors and were keen to extend initially 'one-off' opportunities to do this into the core-curriculum (A. Paterson, personal communication, April 27, 2004).

Environmental organisations

Scottish Natural Heritage saw the headteacher's enthusiasm, Inveraray's central location and expansive school grounds as an ideal opportunity to demonstrate their ideal for school grounds development. They hoped through this to increase the number and quality of School Grounds Grant Applications from schools (Fergus Younger, Area officer, SNH – Argyll and Bute, personal communication, April 29, 2004).

Up to 90% of Scottish school grounds are either bare landscape, grass, tarmac or a little bit of both (GfL, 1999). As a national organisation that helps schools to make the most of their school grounds for better play, learning, growth, social, physical, and mental development of pupils, GfL sees this as very unsatisfactory. The organisation encourages the teaching of all aspects of the curriculum using the outdoors. It does this in part through organising and securing sponsorship for programmes such as 'The Sky Above The Earth Below' competition and the 'Learning Outside Inside' action research curriculum project (GfL, 1999).

AN ANALYSIS OF SUMMATIVE PROGRAMME IMPACT THEORY

What follows is an assessment of the impact theories of all the EE programmes at Inveraray that have been analysed in this case study. The analysis of the Minibeasts, Butterflies, Rubbish and Recycling, and Planet.com topics according to the Hungerford

and Volk (1990) model shows the extent of the development of environmental citizenship behaviour (see Figure 5.1 and Figure 5.3). This is discussed first under the section Environmental Citizenship Benefits. An analysis of the impact theories for the 'Learning Outside Inside' Action Research Curriculum Project and The Sky Above The Earth Below Competition reveals other impacts. These are discussed under three headings: Personal Development, Community Development, and School and Teacher Benefits. These benefits do not easily fit under separate headings and so have fairly indistinct boundaries.

Environmental Citizenship Benefits

The findings (see Figure 5.1 and

Figure 5.2) show that the four topics; Minibeasts, Rubbish and Recycling, Butterflies, and Planet.com, develop predominantly the *Entry-level* variables of 'knowledge of ecology', 'environmental sensitivity' and 'attitudes towards pollution, technology and economics'. Teachers hope that after the coverage of the topic at the school, pupils' interest will be sparked and they would go and develop an in-depth knowledge on their own, through personal experiences of the outdoors, the Internet, reading or from other sources. The only *Empowerment* variable that was identified is when pupils learn conservation of endangered species at local level under the P1/2 Minibeasts topic. *Ownership* variables identified were a 'personal investment in issues and the environment', in P4/5, when learners care for the environment and know the reasons they should conserve 'their' species and flowers and 'their' species of butterflies. Another *Ownership* variable is a 'knowledge of the consequences of behaviour'. This occurs in P6/7 when pupils are sensitised to be able to make observations independently about issues.

Personal Development

Cognitive impacts

The Impact Theory for the Maths in the School Grounds programme (see Figure 5.4), derived from evidence described on p.135, points clearly to the fact that Mathematics concepts taught in the school grounds through specially formulated games and through grounds development activities are taught more successfully, and in a shorter period of time. Again from the same evidence base it is clear that this result is due to a complex contribution of factors that include catering for preferred learning styles, creating situations for meaningful learning, and teacher factors.

Under the School Grounds Project the school created various habitat areas associated with Scotland. These were incorporated into the curriculum. The process had given staff an opportunity to take a fresh look at topics and how they could involve maths in some of the developments. As a result Inveraray Primary's school grounds developments presented many opportunities for making the pupils aware that maths is "real". Pupils saw that in many of their school grounds development activities they often needed to use a variety of processes, e.g. comparing, finding the difference, adding, subtracting, multiplying, and dividing. A lot of the activities have involved a need to cost developments. Data handling activities are very real and this has been very motivating to the pupils (Paterson, 2003a).

In fact, the benefits seen in teaching curricular areas in the outdoor environment were so significant at Inveraray Primary that the head and teachers at the school were very enthusiastic in expanding the programme to cover as many curricular areas as possible (Paterson, 2003a). The school currently prides itself of being able to teach all curricular areas using the outdoor environment (A. Paterson, personal communication, April 27, 2004).

The Impact Theory for the Sky Above The Earth Below competition (see Figure 5.3) illustrates how pupils were involved in the development of the school ground mosaics from the generation of ideas to taking part in aspects of the actual construction of the different mosaics. Pupils also decided on the location of each mosaic in the school grounds. Consequently permanent structures have been created in the school grounds that make the grounds more interesting to pupils, staff and visitors. As well as forming part of pupils' play activities the mosaics are a teaching resource (see p.151) (Paterson, 2003b).

Activities under the Rubbish and Recycling Topic outlined in the topic's Linear Logic Model (Appendix III, p.423) are learner centred. The problem is personalised and pupils are challenged to carry out activities related to the solution of this problem, including peer education of other pupils in the school.

Affective Impacts

Teachers hope that from the Minibeasts, Rubbish and Recycling, Butterfly, and Planet.com topics pupils will learn respect and care for living things and the environment; they will learn to care for their environment and that what they do matters; they will become less self-centred, more considerate towards others, thoughtful in decision-making, and think of the wider world when considering their part in the world. The headteacher speaks about the 'joy and interest' of the pupils at learning in context, in the environment (Paterson, 2003a).

Literature backing for the claim that activities at Inveraray have affective impacts on participating students may be found in Rickinson, Dillion, Teamy, Morris, Young Choi, Saunders and Benefield (2004, p. 34) who found a number of studies that highlight changes in self-esteem and confidence through participation in improvement projects within the school setting. Rickinson et al. (2004) carried out systematic and critical review of research on outdoor learning published internationally in English from 1993 to

2003. This is an important publication as it presents the most recent international research findings in this important area. The authors cite Reid (2002) who found children's confidence grew greatly as they realised the strategies they used to solve problems; also Berkeley, California, Moore and Wong (1997) who found that when part of the asphalt school grounds were transformed into natural features such as woodland, gardens and ponds this led to children developing more positive relationships with each other in these natural areas and exhibiting more creative play and learning activity. They concluded that well-designed school grounds provided opportunities for young people to socialise with each other and facilitate positive inter-personal relations.

At Inveraray Primary school Maths in the school grounds gives opportunities for co-operation between higher and lower classes as the older pupils assist younger pupils in ground development tasks. In many cases, teachers have found that pupils' behaviour is better outside.

Community Development

Although this was not articulated by the staff at the school, and thus does not feature in the impact theory of school programmes, Inveraray Primary School receives visitors from other parts of the UK as well as from other countries. These visitors come on educational visits stemming from the reputation of the school. This is a result of, among other things, its success as a model of good environmental education in the primary curriculum using the school grounds as an integral part of this curriculum. This brings revenue into the Ancient Royal Borough of Inveraray, through hotel bookings and related spending, as well as local shopping.

School and teacher benefits

The benefits being experienced at Inveraray by the school and teachers are well documented in Evergreen's (2000) review of literature that discovered a common thread of teacher benefits in participation in school grounds projects. These are new curriculum connections; increases in morale and enthusiasm for teaching; new reasons to go

outside; increased engagement and enthusiasm for learning, and reduced discipline and classroom management problems.

CASE STUDY 2: CURRIE COMMUNITY HIGH SCHOOL

INTRODUCTION

Currie Community High School (Currie High) is located on the southwest edge of the city of Edinburgh approximately six miles from the city centre in a built-up suburban area. The school was built in 1962 and refurbished in 1998.

The school has a longstanding commitment to the environment. At the planning stage of the school's refurbishment the brief to the architects emphasised this, specifying the following features to reduce the environmental impact of the building: low CO₂ loading/high level of insulation, low CFC materials used, all timber from renewable sources, low energy lighting, natural ventilation wherever possible and air conditioning only where unavoidable, a heat recovery unit and energy management system (Nind, 2004).

Environmental projects started in the school in 1989 when five S6 pupils entered a competition to improve a square mile of their local environment. They investigated the history of the strip of ancient woodland at the eastern edge of the school and worked hard to clear years of litter from the burn. Inspired by this the school, with the support of the local Community Council, took on the management of the wood and over the years developed other areas of the grounds for use both in the curriculum and for amenity (Nind, 2004). Throughout this period the school has been committed to Environmental Education both within the curriculum and through extra-curricula groups (Nind, 2004).

Currie High operates an integrated policy of habitat replacement. Before the school was built the area contained meadows, ponds, hedgerows and woodland. These habitats each supported their own particular community of animals and plants (Walton & Nind, 2000).

ENVIRONMENTAL EDUCATION PROGRAMMES

Environmental education programmes running at Currie High discussed in this report are Roley's Wood, various school grounds ecology sites that include The Quadrangle, Wildflower Hay Meadow, Conservation Currie, S1 and S2 ESD courses, the Sustainable Secondary Schools Partnership (SSSP) pilot project, Eco Schools, and the Animal Lovers Club. For the purposes of this research I interviewed the headteacher, the environmental projects coordinator at Currie High, a retired Biology teacher who has been volunteering in the development and maintenance of the school ecology sites for the past 16 years. I interviewed two Science teachers together, the Teacher in Charge of the Animal Lovers' Club, and the Information Technology (IT) teacher. I observed the S1 ESD class, Conservation Currie activities and was given a guided tour of the school ecology sites. I provided my standard Document Request Form and was given access to several documents. A list of documents used to verify and complement interview and observation may be found in Appendix IV.

Information obtained from the documents, interviews and observations was analysed to describe important predetermined aspects of individual EE programmes that constitute a linear logic model. These aspects are described on p.104. The linear logic model, drawn for the various EE programmes running at Currie High and their resources and prior functions, may be found in Appendix IV.

What follows is a description of the various EE programmes running in the school, with Programme Theory providing an organisational framework for the presentation of individual EE programme information.

Roley's Wood (see Plate 12) is situated at the eastern edge of the Currie Community High School campus. This woodland strip, originally the "Curriehill Woodland Strip" was renamed in March 2001 (www.CurrieEcology.org.uk). It contains the remaining 300m of an ancient wood that used to stretch right up to the Pentland Hills, but was chopped down when houses were built. The wood has Ancient Wood Status and

contains indicator species such as Enchanter's Nightshade, that indicate that this has been a woodland since the 17th Century. In the early 20th Century it was replanted as a shelterbelt. Unfortunately the species that was used was elm. Elm is susceptible to Dutch Elm Disease, and this had actually begun to destroy the wood when the school intervened in 1989. As well as dying of Dutch Elm Disease the wood had also become established as a rubbish dump for building materials from the school (Volunteer, personal communication, May 10, 2004).

Roley's Wood



Plate 12 The entrance of Roley's Wood.

In 1998 the wildlife corridor at Currie High was extended around the perimeter of the school grounds by the creation of new belt of trees. This work was co-ordinated by the Edinburgh Urban Forest Project, whose aim is to create community woodlands across

the city through community planting projects, with funding from the Millennium Forest for Scotland Trust. At Currie High pupils and conservation volunteers planted 3000 native Scottish trees, including oak, rowan, ash and willow. A wildlife corridor has been created between Roley's Wood and other stands of mature trees in the area, which will allow birds and other animals to move freely.

The new wooded area also greatly increases the biological diversity of the site, which was previously dominated by grassed areas. The planting of native spring bulbs (bluebell, snowdrop and wood anemone) also enhances this change. The trees also provide valuable shelter for the playing fields and add visual diversity to the site.

Wildlife corridors are vegetated linear spaces that connect areas of green space; they can be hedgerows, disused railways lines, watercourses or woodland strips. These features are important for plant and animal species conservation as they allow their movement between areas – extending their feeding and breeding range. They also provide valuable accessible green space for people as linear routes allow people the opportunity to find solitude from urban living and provide safe and attractive routes for walking and cycling within the city and out to the surrounding countryside. At Currie High Roley's Wood provides a valuable green link from Currie Station up into the Pentland Hills (www.CurrieEcology.org.uk).

The school has established a nature trail that goes through the wood (See Plate 13 and Plate 14). The Woodland Nature Trail has seven stations, each with worksheets, activities and (exciting) things to explore. Information on the nature trail is available on the school web site, from which accompanying resources can be downloaded (www.CurrieEcology.org.uk).

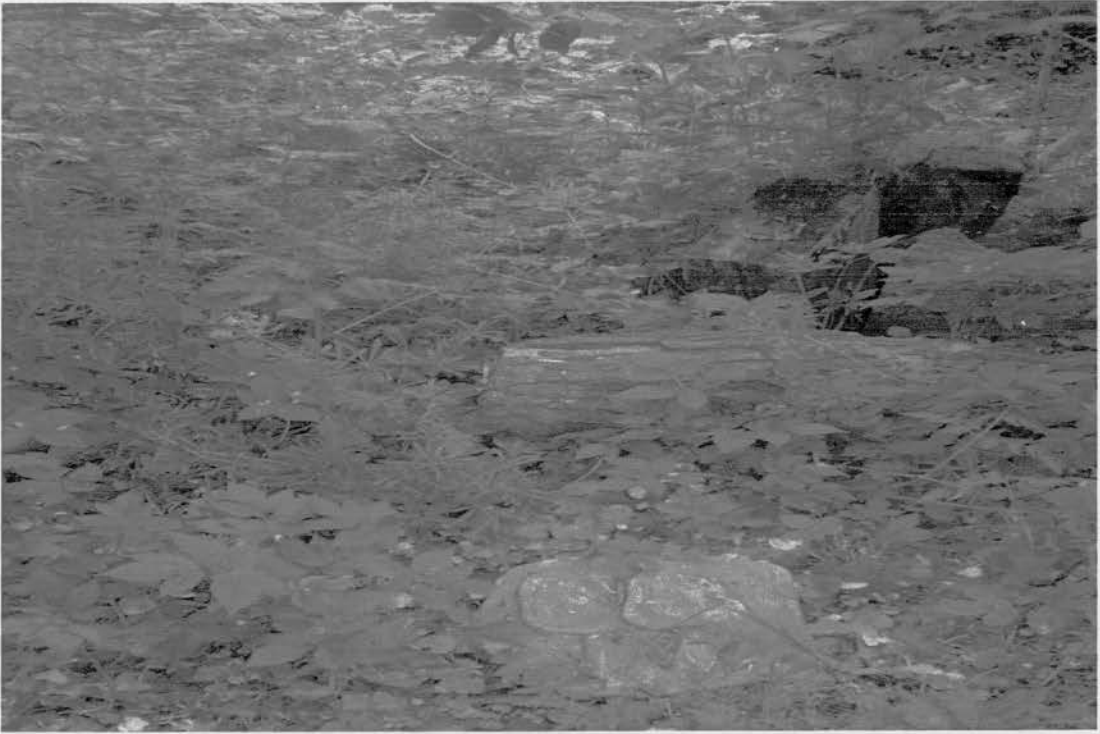


Plate 13 Nature Trail – Station 3 “Fungus”.

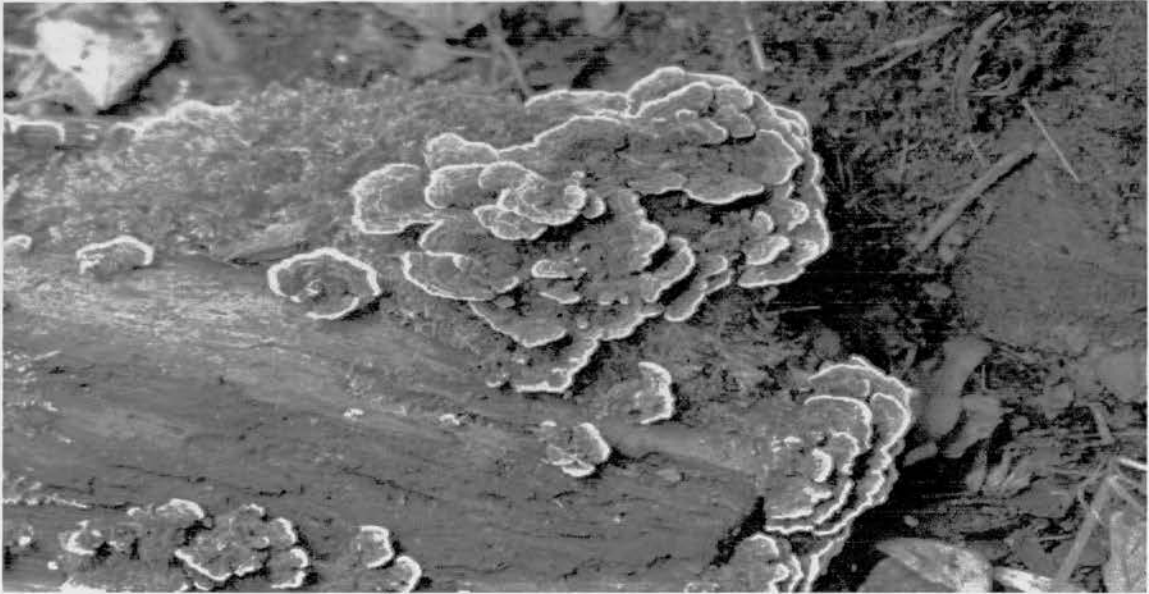


Plate 14 Nature Trail – Station 3 “Fungus stamp”.

(Source: www.CurrieEcology.org.uk)

A freshwater stream or burn (Scottish for stream) flows through the woodland. It offers another habitat that pupils can study within the school grounds. Burns are at particular risk in the urban environment. This is because to control the flow of water and release land for building they are frequently put into artificial channels with almost no value to wildlife, or are piped underground. Even when they are allowed to flow more naturally they frequently become dumping sites for refuse (Carroll, 1996).

The Quadrangle

The quadrangle is set in the centre of the school and is completely surrounded by the school buildings. It has been developed for use as an outdoor classroom and has a variety of habitats in its small area, including a pond and marsh area supporting a population of amphibians and invertebrates (Nind, 2004). The pond offers classes at all stages the opportunity to investigate a variety of plant and animal life. There is also a flowering plant area, including grasses for teaching plant classification, a cryptogamic area to demonstrate spore-bearing plants and a Japanese garden. The Japanese garden provides a haven for peaceful reflection for teachers at break times, while pupils come into the area for outdoor lessons under supervision. The Quadrangle has a little ecosystem to illustrate the interdependence of living things as well as energy flow. The Quadrangle is used for teaching interactions of living things, i.e. the teaching of food webs. The area has also attracted blue tits that are breeding in a nest box with a video link that records its breeding cycle. The video link is available for view continuously at various parts of the school.

In the past ponds were a familiar feature of farms and villages. They provided a ready source of water for horses, which were the main source of transportation and 'motor' power, and for farm stock. Ponds provided habitats for many kinds of invertebrates as well as frogs and newts (Carroll, 1996). There are resources for use in these areas on the school website. Classes can download these as needed for learning purposes (www.CurrieEcology.org.uk).



Plate 15 The Quadrangle.

Wildflower Hay Meadow

This was created from half of the janitor's garden. It involves the active planting of native species of wildflowers in among the normal grass monoculture of this part of the school grounds. The flowering plants attract insects that in turn attract birds and bats. There are bat boxes and bird boxes in the surrounding trees. An established hedge has recently been "laid" using traditional methods. The hedge completely covers the wildflower meadow. It partially replaces a lost habitat for wildlife where the school was built. At the end of every summer the hay meadow is cut and pupils make meadow hay, which they bag and give to people with horses.

Before the introduction of large farm machinery and cheap wire fencing, fields were small and surrounded by thick hedges to keep animals either in or out. Occasional trees

were allowed to grow up from the hedge to provide the farmer with timber. Hedgerows provided food supply and homes for a wealth of insect life, small animals and birds (Carroll, 1996). Thus the creation of a wildflower meadow, however small, can add a resource for work on sampling an ecosystem and learning about plant diversity and interactions including insect pollination (www.CurrieEcology.org.uk).

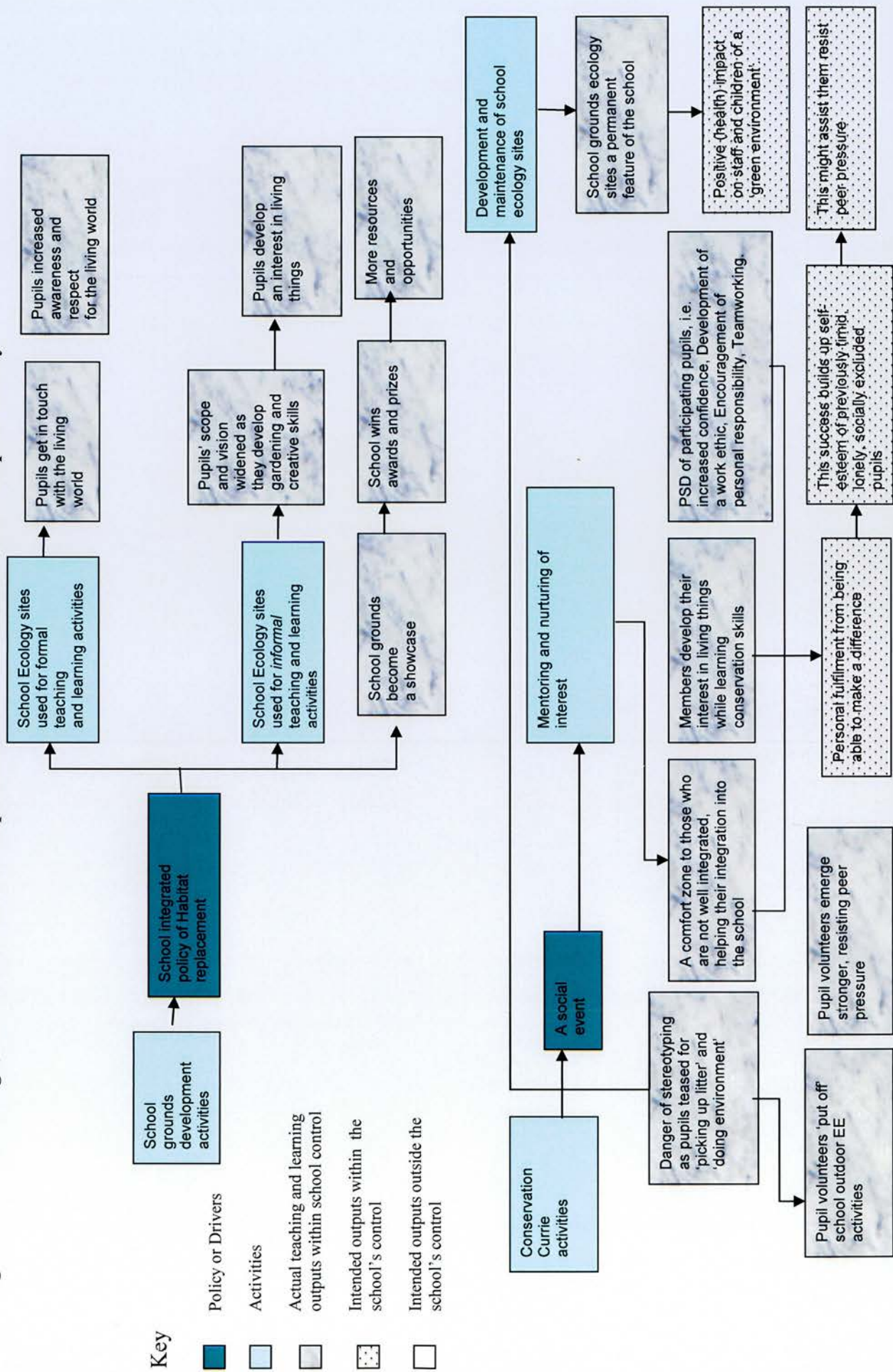
Until this century, grazing meadows and hay fields had a natural mix of many kinds of wild grasses and flowering plants. The rich supplies of nectar supported large populations of flying insects, including many kinds of butterflies and moths. To increase the yields of animal fodder, farmers nowadays sow their fields with few kinds of specially bred grass and clover. A typical field may contain just one variety of ryegrass and one of clover, creating a uniform carpet over acres of land. Regular cutting for grass-drying or silage production (silage preserves the grass through a special type of fermentation) may suppress flowering altogether. The resulting 'green desert' supports little in the way of wildlife (Carroll, 1996).

Conservation Currie

Approximately fortnightly, on Wednesdays, a group of 8-10 Currie high pupils meet with the Environmental Projects Coordinator at Currie High and a retired Biology teacher (who has been a volunteer for the past 16 years), the CDT technician, a parent volunteer, and two or so pupils from Curriehill primary school. Pupils in this group include volunteers in the school's Duke of Edinburgh programme. The group has lunch together and then carries out conservation activities in Currie High School grounds. This group is called Conservation Currie. Attendance by members is purely voluntary. The group's activities include mowing the paths in the wildflower meadow, planting new trees and bulbs and picking up litter. Pupils come from different parts of the school and their aim is to help maintain the various habitats or ecology sites that have been developed within the school during the past 16 years, so that 'ecology sites' are not in danger of closure due to a maintenance issue such as a leaking pond, a blocked burn, or a meadow not maintained (Volunteer, personal communication, May 10, 2004).

What follows is a presentation of the impact theory for the School Grounds Development and Conservation Currie programmes at Currie High (Figure 5.5). As explained in p.107 the temporal sequencing of components in the impact theory is used in the present study as a valuable analytical tool highlighting important issues regarding the real and projected impact of the individual EE programmes. All impact theories drawn for EE programmes at Currie High are the basis of the analysis of the summative impact of the school's EE programmes presented on p.186.

Figure 5.5 Currie High, School Grounds Development and Conservation Currie – Impact Theory



School grounds development programme organisational plan

This is made up of the programme's aims, services it provides and its resources and prior functions. The first two are presented here. The programme's resources and prior functions are presented in Appendix IV.

Programme Aims

The Ecology sites in the school grounds have been developed over the last fifteen years to achieve six aims:

- To demonstrate and replace habitats lost during the urbanisation of the area
- To maintain and enhance biodiversity in the school grounds
- To use the habitats created as a teaching resource
- To promote understanding of the need to preserve the environment for the future
- To enhance the school and its surroundings and provide an amenity resource for the school and the local community
- To instil in young people respect and wonder at the diversity of life around them (Nind, 2004).

Services the programme will provide

The school grounds development began in the summer of 1989 and has continued to the present. The school believes that social and economic developments in our time should not jeopardise future generations. To determine whether the developments at Currie High School are sustainable they have decided to use biodiversity as an indicator – that is diversity of species and diversity of habitats (Walton & Nind, 2000). The school grounds development work is thus the school's way of replacing habitats lost as a result of the school being built in the area, and encouraging biodiversity. Key figures in the school's environmental concern are the Environmental and Sustainable Development Education Coordinator and a volunteer. They inspire innovation and pupil participation as well as encourage the use of the grounds for teaching and learning by the rest of the

school. The group Conservation Currie carries out development and maintenance work on the school ecology sites that have been developed.

The Sustainable Secondary Schools Programme

In 2001 Currie High was selected as one of six schools in Scotland to participate in a pilot project to develop practical approaches to Education for Sustainable Development (ESD) in secondary schools. The Sustainable Secondary Schools Partnership (SSSP) proposed the project. This is a partnership of nine government and non-governmental organisations of the built and natural environment that worked with the selected schools. The Heritage Lottery Fund funds this partnership. The Sustainable Secondary Schools Partnership organisations are:

Eco Schools

International Development Education Association of Scotland

Learning and Teaching Scotland

Royal Society for the Protection of Birds, Scotland

Royal Incorporation of Architects in Scotland

Royal Town Planning Institute in Scotland

Scottish Civic Trust

Scottish Natural Heritage

World Wide Fund for Nature, Scotland

(Nind, 2004)

Participating schools were chosen from a rural, urban, and suburban background or catchment area, and geographically spread around Scotland. Participating schools got a certain amount of funding as well as support from all the organisations in the partnership. The relationship is a symbiotic one as these partner organisations are looking for ways to engage secondary schools, all secondary schools in Scotland, in education for sustainable development. Because of curriculum and time constraints schools do not normally involve most of the organisations that make up the partnership. Hence the partnership will help schools with ideas for implementing sustainability and

ESD, and in turn the partner organisations will learn how they can help schools (Environmental Projects Coordinator, personal communication, May 12, 2004).

Currie Community High applied to participate in this partnership, and was chosen on the strength of their environmental education work. Participating in SSSP project has resulted in the school extending and diversifying its environmental education programme. ESD was incorporated into the School Development Plan from 2001 and a member of staff is responsible for coordinating the initiatives supported by a team of five other staff. The School Management Team (SMT) has given strong support to this initiative. The School Board, comprising elected parents, teachers and co-opted members together with two local councillors, have taken a particular interest in this work. Equally involved is the City of Edinburgh Education Department through the school's Neighbourhood Liaison Officer and Senior Quality Improvement Officer. They receive regular reports on the progress made (Nind, 2004).

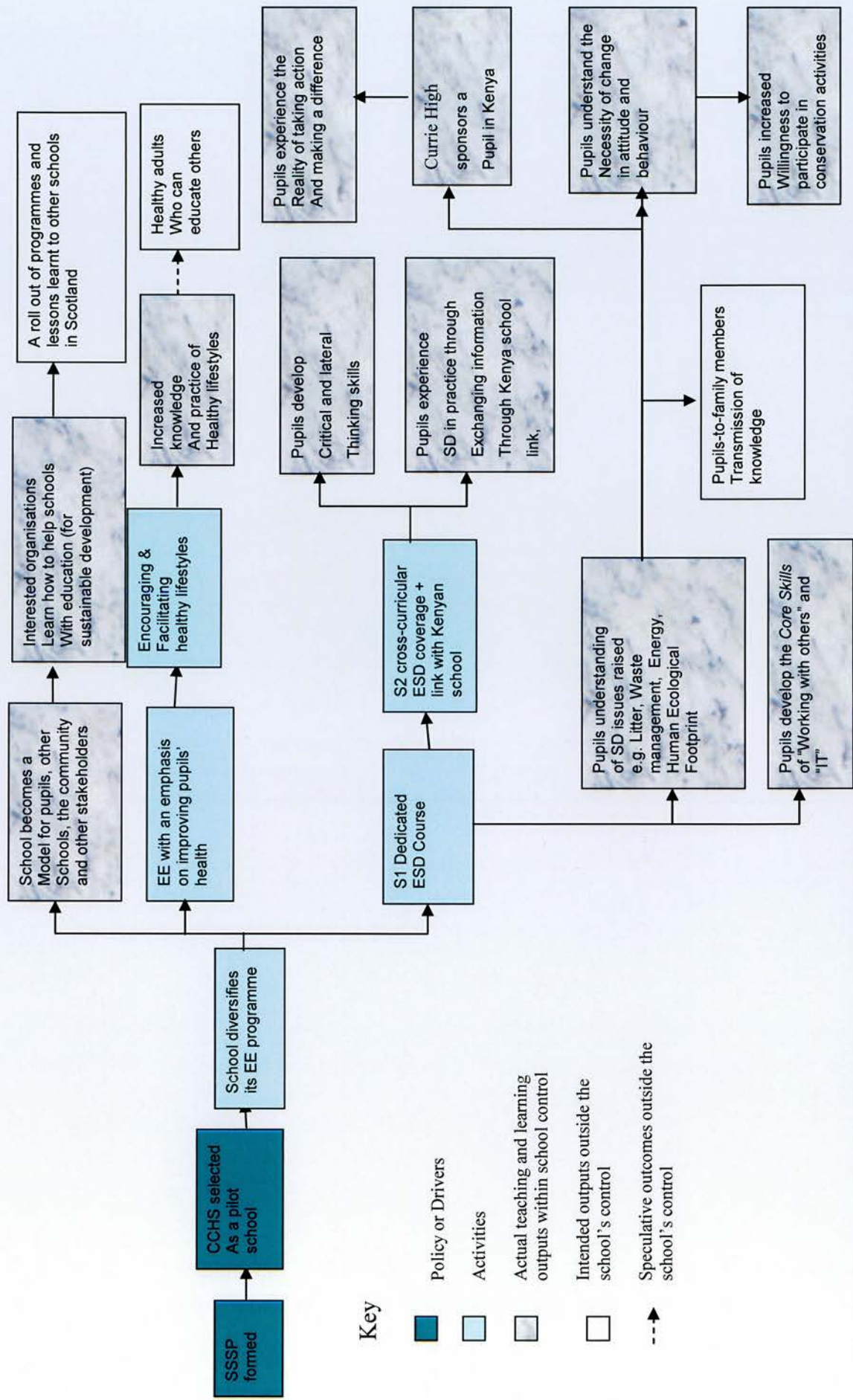
On starting the SSSP project Currie High began by deciding that their main thrust under this project would be to work to improve the health and well being of pupils and staff without restricting themselves only to this. After they had carried out various activities on health improvement the headteacher asked the steering team to create a course in S1 that would be particularly focused on raising an understanding in the young people about sustainable development issues (Nind, 2004). The team brainstormed ideas and then worked with a consultant, funded by SSSP to develop the course. Details of the ESD course outline can be found in Appendix VIII.

The course in S1 was orientated with a local focus on Scotland and change over time, specific emphasis being given to 50 years ago and 50 years in the future. In S2 this approach was extended to include global and development issues. Instead of having a dedicated ESD course at S2, the team felt that a cross-curricular approach would be more practical, integrating work in Modern Studies, IT, English and the extra-curricular Drama Club. The school also formed a partnership with Chogoria Girls High School in

Kenya which gave the opportunity for making ‘real’ connections between academic work and people living in the developing world. It was also felt that as one of the aims is to roll out programmes that work in the pilot schools to other secondary schools, based on lessons learnt, it would be very unlikely that secondary schools would dedicate a course at S1 level as well as S2 level to ESD. Advantages of the cross-curricular approach at S2, besides not adding an additional subject to the curriculum, was that pupils would get more curricular linking and a more holistic experience. It was felt that bringing in the course material in different subjects in the curriculum would promote cross curricula thinking. It would also promote lateral thinking, thus avoiding the common problem of pupil boxing of information. Teaching and learning methods involve the use of investigative skills; collecting and analysing information, intended to create critical thinking skills. Methods also include group work (Environmental Projects Coordinator, personal communication, May 12, 2004).

What follows is a presentation of the impact theory for the S1, S2 ESD Course and the Sustainable Secondary Schools Partnership at Currie High (Figure 5.6). As explained on p.107 the temporal sequencing of components in the impact theory is used in the present study as a tool, highlighting important issues regarding the real and projected impact of the individual EE programmes. All impact theories drawn for EE programmes at Currie High are the basis of the analysis of the summative impact of the school’s EE programmes presented on p.186.

Figure 5.6 Currie High, S1, S2 ESD Course and the Sustainable Secondary Schools Partnership – Impact Theory



The SSSP Organisational Plan

This is made up of the programme's aims, services it provides and its resources and prior functions. The first two are presented here. The programme's resources and prior functions are presented in Appendix IV.

Programme Aims

The SSSP project: aims

- To develop new strategies for teaching and learning in the curriculum, making ESD an integral part of school activity
- To identify future support needs to enable schools to achieve ESD
- To ensure project is effectively documented and made accessible to a wide audience
- To enhance partnerships in the delivery of ESD and encourage consensus on what it means in theory and in practice

(Nind, PowerPoint presentation on the SSSP, n.d)

The SSSP project plan at Currie High: aims

- To raise awareness of the need for change in society to protect the environment for the future and the significant contribution that each individual can make
- To provide the pupils and staff with the opportunity to research and take action on the sustainability issues in their own school and their own lives
- To improve the health of the school community
- To improve the school environment

(Nind, PowerPoint presentation on the SSSP, n.d)

The ESD project at Currie Community High School: aims

- Promote health and well-being in the school community
- Increase pupils understanding of sustainable development issues
- Foster integrated thinking processes

(Nind, PowerPoint presentation on the SSSP, n.d)

The ESD course at Currie Community High School: aims

- To lead pupils to an understanding of the concept of sustainability
- To teach pupils how to investigate and integrate information from different sources so fostering the processes of linked thought
- To encourage and provide opportunity for pupils to take practical action towards preservation of the environment for the future
- Deliver core skills 'Working with others' and 'IT'

(Nind, PowerPoint presentation on the SSSP, n.d; Nind, ESD course outline, unpublished school document, 24 June 2003).)

The services the SSSP and school ESD programme will provide

The SSSP Partnership is a partnership of nine governmental and non-governmental organisations and six schools. The partnership provides each participating school with a certain amount of money. Further, each member organisation in the partnership provides participating schools a certain amount of time and 'in kind' support per year during the course of the pilot. These organisations are keen to engage secondary schools in education for sustainable development but because of time and curricular constraints schools do not normally become involved with these organisations. This partnership is a way of breaking this barrier. These organisations help participating schools with ideas for implementing sustainability and Education for Sustainable Development. These organisations on the other hand learn how they can engage and help schools. Schools were asked to apply to take part in this pilot. Schools were chosen on the basis of having a particular area of strength. Currie Community High School's strength area was its environmental education programme. Once schools were in the programme, teachers from these schools were brought together to 'brainstorm' on their meaning of sustainable development education and their idea of a sustainable school. They were then asked to go away, think about what they wanted to do in their own school and come back with requests for assistance in areas where they needed it. A partnership coordinator was appointed whose job included visiting participating schools assisting

and monitoring each school's progress. Health was chosen as a focal area for Currie High' action plan for the SSSP project. Work to improve the health and wellbeing of the pupils is implemented through the curriculum and through extra-curricular activities (Environmental Projects Coordinator, personal communication, May 12, 2004).

The headteacher suggested the idea of a dedicated ESD course for S1. The idea received support from the SSSP who paid a consultant to work with a cross-curricular team of staff from the school to develop a course outline (see Appendix IV)

The initial idea of a similarly dedicated ESD course at S2 has given way to the idea of putting various aspects of it into existing topics in the different subjects taught in S1 and S2, as well as working with a link to a school in Kenya. The Internet will then be used to exchange information and learn about each other's communities. Pupils would also experience sustainability in action by looking at issues such as fair trade through this partnership (Environmental Projects Coordinator, personal communication, May 12, 2004). Other areas of the S1 and S2 curriculum where ESD is delivered are listed below:

S1 Science: Biodiversity, Interactions of living things, Water cycle, renewable sources of energy

S1 Geography: Weather and climate settlements

S1 City of Edinburgh Council Art Competition: 'The Art of Energy Saving'.

(Pupils portrayed the effect of global warming in Currie. The class won the competition)

S1 Art and Design: models using recycled materials

S1 Art and Design: Sensory paintings inspired by Roley

S1 Art and Design: Jewellery inspired by the natural world

S1 Home Economics: Diary of a day's meals and healthy eating

S1 Geography: water, land settlements

S1 CDT: use of natural resources as related to wood and metal.

S1 English:

Novel: 'The Queen' by Morris Gleitzman. Themes include death and homosexuality,

cancer, AIDS, relationships.

Novel: 'Pair of Jesus boots' Sylvia Sherry. Themes describe poverty in Liverpool, polio victims, and unemployment.

Short Story: 'Grey Leap Frog Race'. Themes include people playing in the streets, prejudices, poverty. Set in USA

S1 cross-curricula link Geography, Art and Science on water topic

S2 ESD is under development. The link established with a school in Kenya will allow materials and information exchange which will be included in S2 Modern Studies, IT, Drama, English, Art and Design and Music

S2 Modern Studies 'One World our World'. Fair Trade

S2 Enrichment programme: drama role play of Bishnoi legend

S2 Modern Studies: 'Clean water' disease and life expectancy

S2 Science: Life Processes: Healthy Diet, Earth: The Earth's Atmosphere (Pollution), Finite Resources.

(Nind, 2004)

The ESD programme is also used to fulfil the requirements for two of the Core Skills required for this level by set National Targets. These are the Core Skills of 'Working with others' and 'IT'. These skills are otherwise difficult to deliver as part of the formal, curriculum. For this reason the dedicated ESD course and the Kenya link are deliberately very IT based (Headteacher, Currie High School, personal communication, May 7, 2004). Pupils working in groups do research for the ESD course in S1. Their main source of information is the Internet and to a lesser extent from books. Some information is obtained by interviewing relatives and members of the community, also from exhibits of artefacts, etc. Pupils write up the findings of their research, search for appropriate images to illustrate their work on the Internet and in books and may create drawings which can be scanned. The pupils then display this work by creating a web presentation on their chosen topic for each group. Individual pupils create at least two

pages each (McKee, 2004; Environmental Projects Coordinator, personal communication, May 12, 2004).

The investigative approach and tasks set during various lessons in this course develop pupils' critical thinking skills. The treatment of various ESD topics in separate subjects develops pupils' lateral thinking skills, discouraging the old problem of pupils 'boxing' information learnt in different subjects (McKee, 2004; Environmental Projects Coordinator, personal communication, May 12, 2004).

Eco Schools at Currie Community High School

Currie Community High School was awarded the Green Eco Schools Flag in May 2004. More detail on Eco Schools is given on p.124.

The Animal Lovers' Club

The Animal Lovers' Club is a voluntary lunchtime club that meets every Tuesday to do various activities which are varied weekly or monthly.

Currie Community High School Animal Lovers Club Organisational Theory

This is made up of the programme's aims, services it provides and its resources and prior functions. The first two are presented here. The programme's resources and prior functions are presented in Appendix IV.

Programme aims

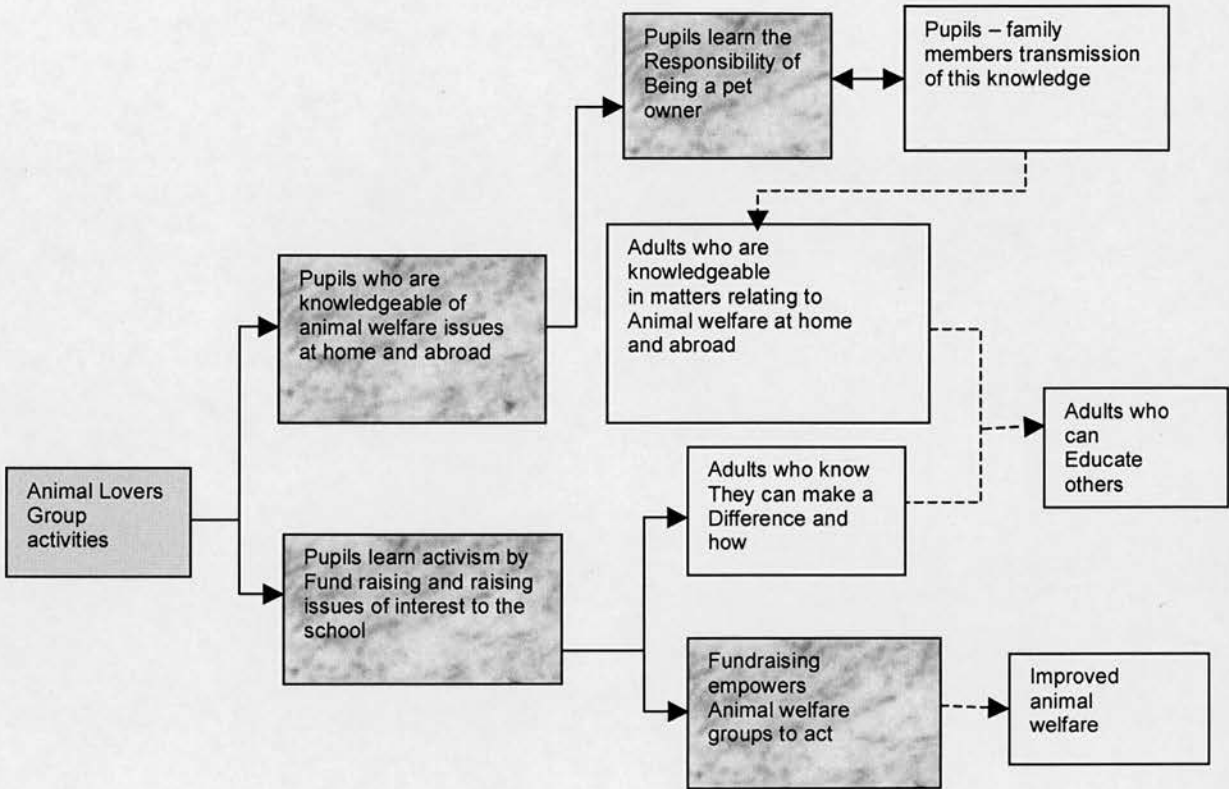
To raise awareness of animal welfare issues at home and abroad

The service the club provides





Membership and attendance at the club is entirely voluntary. The club was started some years back and is run by a teacher from the Music department. She does this on a purely voluntary basis because she has always loved being with, and working with animals of all kinds. The club's primary aim is to raise pupils and staff's awareness of animal welfare issues at home and abroad. The TIC is in contact with several Animal Welfare

groups. These groups are a source of literature in the form of magazines, pamphlets, posters and videos. When pupils meet at lunchtime they carry out various activities including watching a video, reading magazines around a certain issue, holding discussions and debates, holding competitions, quizzes and listening to talks by visiting speakers. The TIC sometimes brings her pets to the school for these meetings. Animal welfare groups periodically contact the club letting them know of campaigns they will be having at the time, and asking the group to help them with fund raising. The club carries out fund raising activities for these campaigns and to a lesser extent to fund the clubs' own activities. These activities include silent auctions, fashion shows, cake and candy sales, jumble sales, sponsored walks. Whole school activities initiated by the club include donations of pet food and bedding, stamp collections and ink cartridge recycling. Stamps when given to animal welfare organisations can be sold to stamp collectors. Ink cartridges are recycled to raise money. On Wednesday afternoon, or Saturday the club sometimes organises social activities such as a visit to the cinema to see animal related films, go to museum exhibitions featuring animals, visit "Deep Sea World", the zoo or a farm. The club also celebrates days like the World Animal Day and Dogs for Togs Day. This is a day that raises the issues of guide dogs for the blind and deaf. The club takes such days as an opportunity to raise relevant animal welfare issues before the whole school. On such days the school may hold a Dress Down Day, and all dressed down pupils bring a pound that goes towards relevant charities. The TIC also puts information animal welfare on school notice boards, often to highlight special animal needs during days such as fireworks days. Fireworks upset a lot of animals and special precautions need to be taken to minimise distress at this time. Again the TIC puts out information leaflets in the staff room for teachers information on matters she feels may be relevant and important regarding animal welfare (TIC Animal Lovers' Club, Currie High, personal communication, May 13, 2004).

figure 5.7: Animal Lovers Club at Currie Community High School



Key

-  Activities
-  Actual teaching and learning outputs within school control
-  Actual other outputs within school control
-  Intended outputs outside the school's control

AN ANALYSIS OF CONTEXTUAL IMPERATIVES FOR ACTION

An analysis of the drivers for participation in EE programmes by Currie Community High School reveals that these relate to policy, staff and pupil values and motivation to provide environmental education, and a need for appropriate teaching resources. As part of the process they become involved in competitions.

Environmental projects started in the school when five S6 pupils entered a competition to improve a square mile of their local environment (see p.164) for details). The school operates an integrated policy of habitat replacement (see p.164) that is guided by the belief (value) that the social and economic developments in our time should not jeopardise future generations (Walton & Nind, 2000) (see p.174). The school uses the different habitats created as a teaching resource, while using the enhanced school environment as a resource for promoting an understanding of the need to preserve the environment for the future. The S1 and S2 ESD course was established for the purpose of raising an understanding in young people about sustainable development issues. In short, the school participates to facilitate environmental education.

AN ANALYSIS OF SUMMATIVE PROGRAMME IMPACT THEORY

What follows is an assessment of the impact theories of all the EE programmes at Currie High that have been analysed in this case study. This is discussed first under the section Environmental Citizenship Benefits. Other impacts are discussed under three headings: Social and Community Development, Personal Development and School Benefits.

Environmental Citizenship Benefits

The school uses the ecology sites and other locations in the school grounds for formal teaching and learning activities to develop knowledge of ecology, which, according to Hungerford and Volk (1990), has been found to be a predictor of environmental citizenship behaviour. The school provides teaching and learning activities in the outdoors to give pupils an opportunity to get in touch with and increase pupils'

awareness and respect for the living world. Again these are predictors of environmental citizenship behaviour (see p.43 and Hungerford and Volk, 1990).

Teaching and learning activities include CPD courses for teaching staff. The school does CPD on *How to develop your school grounds* for Edinburgh City Council. It also offers training to Higher National Diploma students from Oatridge College for students on Conservation and Environmental Education Management courses (Environmental Projects Coordinator, personal communication, May 12, 2004).

The school grounds are also used for informal teaching and learning activities when community classes of young children use the school grounds under supervision, for various activities.

The school hosts many international visits, for example in 2003 visitors came from 17 countries, including Egypt, Kenya, South Africa, Sweden, Hong Kong, Iceland and Germany. The school is considered to be 'a flagship school' by the City of Edinburgh.

Hungerford and Volk (1990, p.9) define an environmentally responsible citizen as one who has (1) an awareness and sensitivity to the total environment and its allied problems [and/or issues], (2) a basic understanding of the environment and its allied problems [and/or issues], (3) feelings of concern for the environment and motivation for actively participating in environmental improvement and protection, (4) skills for identifying and solving environmental problems [and/or issues], and (5) active involvement at all levels in working toward resolution of environmental problems [and/or issues].

This definition of an environmentally responsible citizen is used below to analyse the activities at Currie High. As appropriate a prefix of (1), (2), (3), (4) or (5) taken from the above definition by Hungerford and Volk precedes each statement relating to the development of the relevant aspect of environmental citizenship. The characteristics included in this analysis of the development of environmental citizenship behaviour

include those for which empirical evidence exists as well as others that reflect the intentions underpinning certain activities as illustrated in the relevant sections of each programme's impact theory diagram.

(1)(5) The activities of Conservation Currie through mentoring and the nurturing of interest, results in increased confidence, the development of a work ethic, team working and an encouragement to take personal responsibility. When participating pupils find that they do make a difference through their efforts they experience personal fulfilment and the success builds their self-esteem. This increases their internal locus of control (see Hungerford & Volk, 1990). Members also develop their interest in living things while also learning conservation skills. This knowledge of and skill in using conservation strategies together with the increased locus of control constitute two major *Empowerment* variables (see Hungerford & Volk, 1990).

(2) The ESD course for S1 and S2 gives pupils an understanding of sustainable development issues. Issues covered include litter, waste management, energy, and the human ecological footprint. Teachers hope this knowledge about issues helps pupils understand the necessity of a change in attitude and behaviour. **(3)** Teachers have noted that such knowledge results in an increased willingness on the part of the pupils to participate in conservation activities. This supports the assertion by Hungerford and Volk (1990) that 'when individuals have an in-depth knowledge about issues, they feel more inclined to take a citizenship responsibility towards those issues' (p. 12).

Connected to the ESD course is the SSSP for which Currie High is one of six pilot schools. The practical approaches to ESD that are being developed and exemplified at Currie High will provide a stimulus for other schools in Scotland. Further, governmental organisations concerned with the built and natural environment that make up this partnership will learn how to engage secondary schools in ESD and help them develop and deliver it despite time and curricular constraints. Through the link with Chogoria Girls High School in Kenya pupils at Currie High will sponsor a pupil who would

otherwise be unable to go to school. (5) This will give them an experience of the reality of taking action and making a difference.

Through the activities of the Animal Lovers Group pupils learn activism by fundraising and raising issues of interest to the rest of the school. (2) The activities taking place in this Group involve the development of an in-depth knowledge about issues regarding animal welfare, and (3) the development of feelings of identification with the issues (3) to the extent that pupils participate voluntarily in fund raising activities, (4) the experience of which leads to knowledge of environmental action strategies and (3) the knowledge that they can make a difference through well-timed, appropriate efforts.

Through in-depth knowledge of the issues, pupils no doubt develop the Minor *Ownership* variable of knowledge of the consequences of behaviour – both positive and negative (see Hungerford & Volk, 1990).

Social and Community Development

The extension (in 1998) of the wildlife corridor around the perimeter of the school grounds at Currie High by the planting of new belt of trees created a wildlife corridor between Roley's Wood and other stands of mature trees in the area. This allows birds and other animals to move freely – extending their feeding and breeding range. This new wooded area also greatly increases the biological and visual diversity of a site previously dominated by grassed areas. The trees also provide valuable shelter to the playing fields at Currie High.

The wildlife corridor provides valuable accessible green space for people as they allow urban dwellers the opportunity to find solitude, providing safe and attractive routes for walking and cycling. Roley's Wood also provides a valuable green link from Currie Station up into the Pentland Hills.

Inso far as the school may be considered part of the community, the replacement of lost habitats and consequent increased biodiversity that embodies a large part of the school's EE activities is a community development, if only because the increased biodiversity will not be confined only to the school grounds.

The school holds Community Classes. These include 'Lets Look' classes for P1-4 children. This is a Community Education class and parents pay for their children to take it. Children learn through an explanation of the topic followed by investigative activities, observation, games and craft. The school also offers adult classes on organic gardening, willow weaving, etc. The environmental projects coordinator also works with a community group that do practical woodland management. This group is called Occasional Volunteers. The school is also available to give advice to groups working on environmental projects in the area. The school sometimes hosts visits from local primary schools, special needs groups and local nursery schools (Environmental Projects Coordinator, personal communication, May 12, 2004).

As a pilot school under the SSSP the lessons learnt at Currie High are of course valuable to a broader community of schools in Scotland. As outlined in p.187 the school delivers CPD for Edinburgh City Council teaching staff and is a site for conservation courses for a local college. Through the 180 pupils in S1 who do the ESD course teachers see the potential of reaching 700 people through pupil-to-family members transmission of knowledge regarding sustainable development issues such as litter, waste management, energy, and the human ecological footprint. A similar argument applies to the Animal Lovers' Group

Personal Development

Cognitive benefits

Lisowski and Disinger (1991) found that field-based programmes in the sciences are effective in assisting students' understanding and retention of selected ecological

concepts. They demonstrated that abstract concepts were taught and learned effectively through experiential field instruction. Piagetian theory advocates that provisions for direct experiential, relational opportunities assist and enhance learning (in Lisowski and Disinger, 1991). Interestingly none of the teachers actually cited improved academic performance as a key reason for carrying out habitat replacement in ground development activities. The importance of this outcome is however implicit in the way the grounds are structured for teaching and learning activities, and the resources that have been invested in establishing an Internet site on the ecology sites and related teaching support materials.

The ESD programme is used to capture the development of two Core Skills of 'Working with others' and 'Information Technology (IT)' required for this level by set National Targets. These skills are otherwise very difficult to develop as part of the formal, examinable courses, (Headteacher, Currie High School, personal communication, May 7, 2004). For this reason the dedicated ESD course and the plans for the Kenya link are deliberately very IT based. Pupils, working in groups, do research for the ESD course in S1 mainly using the Internet. Pupils select a topic from the list given in the course outline and develop a group web page that features the individual work of members of the group who will all be working on this common topic.

Instead of having a dedicated ESD course at S2, as was the original plan, the school has decided to put various aspects of it in different subjects at S2. The reason being that since the idea is to roll out programmes that work in these pilot schools to other secondary schools, it would be very unlikely that secondary schools would dedicate a course at S1 level as well as S2 level to ESD. The school felt that the suggestion to spread the course out into 'carrier subjects' across the curriculum would be more practical. Besides not adding an additional subject to the curriculum, the perceived advantage of this approach was that pupils would get more curricular linking and a more holistic experience (Environmental Projects Coordinator, personal communication, May 12, 2004).

It's a holistic approach. There are a lot of critical thinking skills involved....So where we are bringing in this material in different areas of the curriculum, you are promoting cross curricular thinking. You are promoting lateral thinking. So that they put information from there with that from that, rather than the great problem as you know is boxes. You've come out of one subject, you switch your mind off and you go to the next one. So we are trying to help them think laterally. ... The type of methods that we use are investigative research skills. Collecting and analysing information creates and promotes critical thinking skills. Also working as a group (*Environmental Projects Coordinator, personal communication, May 12, 2004*).

Affective impacts – encompassing attitudes, values, beliefs and self-perceptions.

At Currie High teachers believe that formal and informal teaching and learning activities result in an increased interest and respect for living things and other personal benefits. For example, they suggest that doing outdoor activities and gaining skills such as willow basket making from the willow grown in the school grounds (as part of craftwork) widens pupils' scope and widens their vision of some of the skills that have been lost as social development has gone on.

We have lost a lot of the skills that we had originally. The gardening skills, the creative skills, they have disappeared to a certain extent and any experience they (pupils) can get of that I think is valuable (*Volunteer, personal communication, May 10, 2004*).

Outdoor activities also basically get them in touch with the living world, and according to staff, through this:

It just increases their awareness and respect for the living world (*Environmental Projects Coordinator, personal communication, May 12, 2004*).

Conservation Currie activities develop participants' existing interest in living things while at the same time teaching them conservation skills. Staff suggest that the small 'family' environment that is Conservation Currie is a haven and comfort zone for participants who are not well integrated and helps their integration. The interpersonal interaction and skills development leads to increased confidence, encouragement to take personal responsibility and the development of a work ethic in a team-working environment. Accomplishing work that makes a real difference builds up self-esteem which, according to the definition adopted by the SCCC is an 'appreciation of your own

worth and importance and having the character to be accountable for yourself and to act responsibly towards others' (White, 1994 in SCCC, 1996, p.7).

Participation is purely voluntary and teachers in the group are always happy when they see a previously excluded pupil participant join with another group of friends and stop attending Conservation Currie. To them the group will have accomplished its purpose when that happens. Teachers hope that the characteristics built in pupil participants strengthen them to allow them to resist peer-pressure. An example is the peer-pressure to quit their interest in the environment and living things because of teasing by peers. The apparent contradiction inherent in teachers both wanting students to maintain their participation in EE activities while being equally happy to see them leave as better-integrated individuals reveals the instrumental nature with which EE activities are sometimes viewed.

The understanding of SD issues that results from the ESD course results in the pupils understanding the need for a change in attitude and behaviour. This results in pupils' increased willingness to participate in conservation behaviour. Teachers have noted this from a greater willingness to volunteer in conservation activities within the school. However this should be put into perspective as in my study I found that only 8-10 students on average participate in Conservation Currie activities.

School Development

The success of Currie High in EE has brought in funding and opportunities, such as selection to pilot projects and initiatives. These have allowed the school to maintain the school grounds developments and ESD initiatives. There is a deliberate move to ensure the sustainability of developments that work and are desirable and as a result the school ecology sites have become a permanent feature of the school.

6 ZIMBABWE: THE CONTEXTUAL FRAMEWORK

As was done for Scotland, the context of Zimbabwe is described according to four guiding themes. These are *policy*, *partnerships*, *programmes* and *values* or *underlying principles*. These themes guided the National Survey and the case studies of individual schools. They were derived from a preliminary survey of the field (of EE) in Scotland done as a prelude to focussing my research questions. Having an in-depth knowledge of the Zimbabwean situation I was convinced that there were enough parallels between the two countries to warrant the use of the same themes to describe the national context of EE in Zimbabwe. Before presenting the description of the Zimbabwean context I will outline the way the national survey was carried out and thus the source of the information presented in this Chapter.

The data collecting protocols used in the national survey in Scotland and in Zimbabwe were the same, except for appropriate changes in the name of office holders. A postal survey questionnaire was sent out to Provincial Education Directors in all nine provincial education offices. The purpose of this questionnaire was to establish contact with each Provincial Education Office; identify the person responsible for EE in the primary schools; elicit names of other key informants; a sampling tool for schools best reflecting the LEA's policy in EE; and to collect nationwide information on EE policy, partnerships, and programmes. The questionnaire also requested them to share any LA documents that give information about EE programmes within their LEA. Information from these documents was used to complement information from the completed questionnaire. Follow-up face-to-face interviews were based on a general interview guide (Patton, 2002) that requested information regarding *EE policy*, *EE partnerships*, *EE programmes* and *EE values* (see earlier discussion, Chapter 2, p.54). All interviews were tape-recorded, one-to-one and structured. They were all based on the same general interview guide. Other key informants interviewed were representatives of voluntary organisations working in the field of EE in the country and who have programmes that target schools.

POLICY

Zimbabwe participated in the UNCED Earth Summit in June 1992 and became a signatory to the Rio Declaration. Other international conventions and protocols ratified by Zimbabwe include the Convention to Combat Desertification, Convention of Biological Diversity and the Climate Change Convention (MoET, 2004).

From a Southern African Development Community (SADC) perspective, in 1993, the region, through its Environment and Land Management Sector (ELMS), introduced a programme to support EE in the region (DNR, 2004). The production of the 1996 *SADC Policy and Strategy for Environment and Sustainable Development: Toward equity-led growth and sustainable development* provided the basis for implementing Agenda 21 within the regional context. Furthermore, a number of SADC environment-related protocols (to which Zimbabwe is signatory) were ratified. Among them are the protocols on Education and Training; Energy; Health; Mining; Shared Watercourses; Revised Protocol on Shared Watercourses; Transport, Communications and Meteorology; and the Protocol on Wildlife Conservation and Law Enforcement (Nhamo, 2003). By 1998, the Regional Environmental Education Programme was in place and one of its objectives is to provide support for EE policy making and formulation. The present study did not investigate the extent to which these have been implemented in present day Zimbabwe.

Zimbabwe had already developed internal national policies and strategies such as the National Conservation Strategy of 1987, The District Environmental Action Plans (DEAP), Environmental Impact Assessment (EIA) policy of 1994, the National Biodiversity Strategy, the Water Act of 1998 and the Poverty Alleviation Action Plan (PAAP) (Shava, Mtetwa, Muzawazi, Stiles, Nhamo, Magava, & Mabvakure, 2001).

Zimbabwe's economy relies heavily on natural resources for generating employment, income, foreign exchange and for sustainable livelihoods. It is for this reason that since

the mid-1990s, Zimbabwe has been developing policies, strategies and statutes meant to harmonise environmental legislation with a view to promoting sustainable development (DNR, 2004). The need to harmonise uncoordinated fragmented pieces of environmental legislation can be cited as the single major drive that led to the drafting of the first Environmental Management Bill in 1997 and its subsequent amendments until December 2002 when it passed into law as the Environmental Management Act (Chapter 20:27), (simply called the 'Environmental Management Act' in all future mention in the present study) This Act was brought into operation by Statutory Instrument 103 of 17 March 2003.

The Environmental Management Act (Chapter 20:27) provides for the sustainable management of natural resources and protection of the environment, prevention of pollution and environmental degradation and the establishment of institutions, plans and policies aimed at promoting the sustainable utilisation and management of the country's natural resources.
(DNR, 2004)

Before the enactment and subsequent bringing into operation of this Act, various ministries and government departments were enforcing environmental laws and regulations. This created problems such as a lack of accountability; duplication of duties, and overlapping mandates. This Act brought all environmental issues under the Ministry of Environment and Tourism, and provided legal backing for the Environmental Impact Assessment Policy of 1994, which previously had no supporting legislation, making it difficult to enforce (DNR, 2004). Although by the time of the enactment of the Environmental Management Act a lot of environmental education initiatives had been undertaken, Zimbabwe still did not have an environmental education policy to coordinate these. It is important to note that Section 4 (d) of the Environmental Management Act states that environmental education, environmental awareness, the sharing of knowledge and experiences must be promoted in order to address environmental issues and to engender values, attitudes, skills and behaviour consistent with sustainable development.

The development of EE policy in Zimbabwe came about as part of the IUCN Regional Networking and Capacity Building Programme (NETCAB) Environmental Education Policy Project in Zimbabwe. Key partners in the formulation of the EE Policy included IUCN-Commission on Education and Communication members, government ministries (Ministry of Environment and Tourism, Ministry of Lands, Agriculture and Rural Resettlement, Ministry of Education, Sport and Culture) and the Zimbabwe Environmental Education Consultative Forum (ZWEECF) (DNR, 2004). This forum was formed in 2000 and is an all-inclusive structure comprising formal, non-formal and informal education sectors. Its mandate was to develop a National EE Policy inclusive of strategy and a sector action plan. Its roles include advising on EE policy, coordinating and facilitating EE activities, and promoting research in EE issues (Shava, et al., 2001).

As noted in IUCN (2001) although there were excellent examples of EE within various sectors of Zimbabwean society before the passing of the Policy and Strategies document, there was difficulty in action planning due to the lack of general environmental or educational policies upon which to build. The participatory approach of the policy formulation process has resulted in a policy document that contains a lot of what was already happening in the various sectors and does not contradict existing work. Its passing into law in July 2004 represented the much-awaited focal point for coordinating planning and action for EE within the various sectors.

The new Zimbabwe National Environmental Education Policy and Strategies document views education in its widest context. Strategies and action plans for each of the policy's nine national objectives, drawn from the national goal are outlined for the formal education sectors, as well as for the non-formal and informal education sectors. In each case environmental education is expected to commence during the pre-school years and continue throughout a person's life. The policy document clearly states that all sectors have a role to play in delivering EE in the nation. The policy and strategies are based heavily on what was happening already in the country within the respective sectors. The

policy also clearly states that there should be collaboration within and between the sectors for the achievement of the common national goal.

The results of interviews with key stakeholders reveal that government policies are not open to interpretation at provincial, district and school level. In the Ministry of Education, the School Services Division, formerly the Curriculum Development Unit (CDU) is given government pronouncements and comes up with necessary documentation or school syllabi in relation to those pronouncements. These are then implemented without modification in all provincial education authorities. This and the fact that decisions about which NGO projects are allowed to operate within the school is only given by the Research and Policy Unit at the Head Offices of the Ministry of Education, Sports and Culture (MoESC), means that there is central control of schools' activities within and outside the curriculum nationwide.

Zimbabwe's new Environmental Education Policy and Strategies, having been signed in July 2004 had not cascaded down into the school at the time this research was carried out. This document has yet to be translated by the School Services Division into a revised syllabus document or a Government Circular destined for the schools. This begs the question, what policy has been guiding EE in the country, especially as this relates to the formal school curriculum? The present research has shown that the primary and secondary school syllabus documents constitute the policy that has guided EE provision in all provinces and their schools in Zimbabwe. The Department of Natural Resources (DNR) which is a department under the Ministry of Environment and Tourism and a key partner in EE provision in Zimbabwe, is guided by the Environmental Management Act Part IV. It thus functions as an Environmental Management Agency for the state. It is guided also by the draft Environmental Policy. Several Environmental Non-governmental Organisations held discussions on the issue of policy at the Environmental Liaison Forum (ELF). The Environmental Liaison Forum brings together environmental NGOs to share information and coordinate activities, build consensus, and influence policy and implementation strategies. The Environmental Non-governmental

Organisations were, in general, guided by what they thought should have been the policy. This in turn was guided by 'global policy' as written in UN documents and in Agenda 21.

PARTNERSHIPS

In Zimbabwe, Government Agencies such as the DNR and the Forestry Commission, environmental NGOs (ENGOS), the Ministry of Education, Sport and Culture (MoESC) as well as various donor agencies come together in various partnerships in the provision of EE. Partners come together in pursuit of a strong common vision, which is that of promoting the sustainable utilisation of natural resources, and limiting environmental degradation (Department of Natural Resources representative, personal communication, 16 August, 2004).

Partnership interactions occur between NGO and NGO, MoESC and NGO, Government Agency and NGO, MoESC and Government Agencies, MoESC and the private sector or individuals. Donor Agencies are the universal partner of all other organisations. Each of these collaborative interactions will be examined in turn below, drawing on the imperatives for their existence, concerns expressed by the partners, and advantages and disadvantages.

Donor Agencies, the universal partner

Donor Agencies whose funds have been used in EE provision were identified as

Deutsche Gesellschaft für Technische Zusammenarbeit – GTZ

German Development Service (DED)

Community Funding, UK

Embassy of the Netherlands

Save Australia

UNDP

UNICEF

Some local sugar estates, and Conservation Trusts have also contributed funding to EE programmes in their area, although such local support was mentioned by only one organisation in this survey.

Donors provide funds for EE activities with their partners. They may come in as a result of a bilateral (government-to-government) agreement, or they may come in to fund programmes with specific partners in the country. Bilateral donor agencies sometimes approach organisations that are working in an area within their own remit and offer to assist with expertise, personnel and funds for a fixed period of time. It is more common, however, for local organisations to approach donor agencies with proposals for funding. Some donors based in the UK and the USA require that the local organisation be in partnership with one of their own country organisations. Otherwise donors considering funding applications request information on an organisation's partnerships as a means of assessing their track record in the field. Other than for these reasons, in Zimbabwe, working in partnership is not normally a prerequisite of donor agencies for access to funding. The obvious benefit of partnering with a donor agency is the injection of much needed capital that usually kick-starts activities, and in present-day Zimbabwe, is often critical in sustaining the same activities. The disadvantages of relying on external donor funds include their fixed-term nature and susceptibility to suspension if the political climate changes. Bilateral partnerships where funding goes through the government are fraught with bureaucracy and funds are difficult to access. Further, bilateral funds are time-limited and resource intensive. They do not result in permanent structures that are sustainable and preserve organisational culture and ethos. This is because they involve big funds for big projects, resulting in the employment of many fixed-term contract staff whose contracts end just as they are settling into existing organisational structures.

NGO to NGO partnerships

- These are always informal partnerships in Zimbabwe. They may arise for any of the following reasons:

- When organisations are reaching out to the same community. In this case they travel together, assist the other's work or add to it. This is done to minimise cost to one or both organisations, increasing the capacity to reach more people. It may also serve to coordinate their message avoiding confusion among recipients. Working together in this case may be an attempt to complement each other's work.
- NGOs may invite each other to teacher workshops they organise. This gives other NGOs the opportunity to address the teachers, without the inherent cost of arranging a workshop.
- For 'Environmental Expos', and the celebration of different environmental 'World Days'. Organisations may meet to develop a common vision and to stage successful events to which all contribute.

My study revealed that these partnerships are fraught with problems of profile. The target audience has to be clear about the nature of the partnership. An organisation may be used to create a good name for another, while such an association may dim another organisation's profile (Mukuvisi Environment Centre Representative, personal communication, August 31, 2004). Other concerns highlighted include one partner's message losing distinctiveness when presented on the same platform as another's. Young organisations in partnership with larger, more established organisations may fail to develop a unique identity, and there is the danger of being 'submerged'. Again because NGOs often compete for resources, such as donor funding and limelight, there is the fear of entering into partnership with a competitor and having to manage competition in the partnership (Director of ACTION, personal communication, September 3, 2004). Finally if the partnership does not work, this may damage an organisation's image, affecting future funding prospects (WEZ Representative, personal communication, August 26, 2004).

MoESC and NGO partnerships

These are vital partnerships as NGOs need clearance from Ministry of Education Head Office's Policy Research and Development Unit before they can collaborate with, or

address an officer in any establishment of the Ministry of Education. On occasion the MoESC writes important letters verifying that the work of an NGO supports national policy for funding applications by partner NGOs. Ministry of Education, Sport and Culture (MoESC) Education Officers (EOs) accompany NGO staff on school competition assessment visits. They bring in vital educational assessment expertise, and their presence encourages the cooperation of headteachers. The presence of EOs allows NGOs safe access to politically volatile communities in the country. For their part NGOs bring to these partnerships knowledge and skills through not only their personnel's expertise, but also the programmes they bring into schools, and training they often provide to MoESC personnel. Non-governmental organisations fund activities that are important but outside the budget of the MoESC. These are activities such as 'environmental sensitisation' camps for teachers and other MoESC personnel, and inter-provincial look-and-learn visits. They also provide logistical support for MoESC staff to participate in these activities.

Being involved in EE programmes and competitions is enjoyable and exciting for MoESC staff and school pupils. Ministry of Education, Sport and Culture however raised concerns about the fact that such collaboration is limited only to activities that are within the remit and mandate of the NGO, and if MoESC suggest anything outside this the NGO cannot assist with funding (Deputy Provincial Education Director, Province C, personal communication, August 31, 2004). Again NGO funding can be withdrawn if the political situation changes. Schools and pupils often put a lot of time and resources into preparing for EE competitions and teachers and pupils may be discouraged if they do not win. Even if they do win, prizes are often not commensurate with the effort and resources invested by the school (Deputy Provincial Education Director, Province C, personal communication, August 31, 2004). Involvement in EE Competitions also requires a great deal of time. Schools however are resource poor (Education Officer (Science), Province D, personal communication, September 15, 2004). This alone is a great imperative that makes partnerships with NGOs desirable to schools and the MoESC in general. In the present economic and political climate, it is becoming more

and more difficult for both NGOs and Ministries to access external funding. Non-governmental organisations expressed a concern that the Ministry of Education was now competing with them for donor funding (Director of ACTION, personal communication, September 3, 2004; WEZ Representative, personal communication, August 26, 2004). They feel that if the Ministry is unable to access these funds, they should support NGOs to access them, as they argue the most important objective is 'getting the job done'.

Government Agency and NGO partnerships

Two factors drive the DNR's desire to form partnerships with ENGOs. First is the desire to reduce competition and complement efforts in the field. They believe that organisations working together will achieve economies of scale by, for example using the same infrastructure. The DNR also have a responsibility to ensure that ENGOs are operating within the limits of their mandates. They do this by creating partnerships in the field and by sitting on the board of some individual ENGOs. The DNR also provides secretarial services on the ZWEECF. The ENGOs however expressed concern at the very limited resources Government Agencies often bring to the partnership, resulting in ENGOs contributing disproportionate resources in a partnership whilst not always getting credit for the work done (WEZ Representative, personal communication, August 26, 2004); again the issue of organisational profile within partnerships. However Government Agencies bring a valuable *extension* dimension into such partnerships. This is because they have offices in all of the country's 58 districts. Trained officers, called Extension Officers, staff all of these. Environmental NGOs sometimes train these Extension Officers in skills related to their programmes (e.g. permaculture) so that they in-turn can assist schools and communities when required or in the course of their own duties among these communities. The DNR has a limited fund which NGOs can tap into to carry out specific activities in EE in the country. This is not well advertised, and remains unknown to most ENGOs in the country.

MoESC and Government Agencies

The Forestry Commission and NRB through their extension officers in every district are a source of expertise to schools in the teaching of EE under subjects such as Environmental Science. The DNR and Forestry Commission also produce conservation material in the form of pamphlets, pictures, booklets and posters that are very useful to schools. They sometimes hold school competitions, such as the Tree Growing and Tree Care Competition by the Forestry Commission.

MoESC and the private sector or individuals

Schools are encouraged to involve stakeholders in school development activities. A school may appoint a bus company owner as the School Patron. As a result pupils may receive free transport to competitions. The school may, for example, approach a local building company and request assistance to build a fishpond. The company does so for free, and supports the school with resources to establish it before leaving the school to maintain the development (Education Officer (Science), Province D, personal communication, September 15, 2004). The company in turn increases its profile in the community and through this markets its services. Schools need such partnerships because they are poorly funded and such assistance helps them to improve their services for the benefit of learners.

Environmental Education Forums

An example of this is the Environmental Liaison Forum (ELF) which was formed in 1995 by a group of ENGOs who saw benefits in collaboration. The forum is an umbrella organisation for ENGOs and Community Based Organisations (CBOs) working with the people, the environment and wildlife. The ELF is made up of over thirty member organisations as well as several individuals. It aims to provide a forum for ENGOs and CBOs in Zimbabwe to identify and debate matters of common interest, build consensus, influence policy and implementation strategies and create an enabling environment for NGOs and CBOs to share information and co-ordinate activities (ELF, 2005)

Discussion

In a major research study in Scotland to map out links between schools and local agencies and to explore examples of effective collaboration between schools and other agencies Tett, Munn, Kay, et al. (2001) found that in general there are three principal factors that contribute to effective collaboration. These are:

added value from collaboration: effective collaboration was sustained where partners were able to achieve 'more' with 'less';

extended range of provision due to collaboration: if only through collaboration providers were able to offer sufficient breadth in the scale and scope of interventions;

complementarity of provision: the most demanding form of collaboration was required to deal with situations involving complex social issues. It was hypothesised that for collaboration to be effective and for satisfactory partnerships to be developed, organisations would need to share, or at least not have conflicting values, purposes, tasks and conditions. The same study identified the following benefits from collaborative action:

- the opportunity to develop a broader curriculum;
- access to a wider range of skills and expertise;
- the coordination of a range of services that contribute to educational work in communities;
- a multi-agency approach to the needs of children and their parents provides added value, extends the range of provision available and provides the means of dealing with complex social situations.

Researchers have also identified a number of circumstances when collaboration is best avoided. Such situations include when resources of time, energy and money are extremely limited, or when organisations are unstable, or when organisations have very similar functions or when continuing support is unavailable (see Huxton, 1996 and Hudson et al., 1999).

The results of research presented here explain how partnerships in EE provision are in operation in Zimbabwe and that to some degree the features identified by Tett et al (2001) are in evidence. These partnerships are however dogged by several problems that are common to the practice of different organisations working in collaboration.

These include problems of profile,

You can be used to create a good name for another institution. As long as your partnership is not very clear to the audience there is a danger. You may not be able to come out quite clearly in terms of bringing out to the (audience) your agenda when you join others (Mukuvisi Environment Centre Representative, personal communication, August 31, 2004)

competition for donor funding,

Especially (partnership) with a government department ... their resources are very limited. You can end up pumping more than them and if you are not very careful they will end up getting the credit (Representative, (WEZ Representative, personal communication, August 26, 2004)

and insufficient government funding from the fiscals.

Although, as illustrated above, there are a lot of collaborative efforts, the resource base for EE provision in Zimbabwean schools remains extremely poor and inadequate (see also p.228). There is a gap in resource provision to ensure sustainable programmes exist within the schools. In general ENGOS go into schools as individuals and start a programme. They then often leave schools expecting them to sustain these programmes. Schools, however, inevitably struggle with a range of issues, not least a lack of appropriate equipment. Most rural, and even urban schools, lack the means to provide simple tools for pupils to carry out school garden programmes. Similarly schools do not have information in accessible form, or otherwise, to use in teaching EE issues related to the programmes brought into the school through NGOs.

There is a need to address the issue of resources for the innovative teaching methods that EE demands. Environmental Non-governmental Organisations, MoESC, Government

Agencies, Donor Agencies and the private sector need to devise a collaborative way forward to ensure that their primary purpose and shared vision of providing EE within schools is adequately resourced. These stakeholders need to make pragmatic decisions about how they will need to work together to ensure a sound resource base that is sustainable to support the new Zimbabwe National Environmental Education Policy and Strategies.

This national survey has elicited several suggestions from stakeholders about a way forward. It is clear that if the Government wishes to support EE it should put money into EE in the formal curriculum. To date no additional funding has been allocated to the MoESC for EE activities that fall outside the formal school teaching of Environmental Science and other school subjects. In other words no additional funding is available for the implementation of EE in schools as long as it is considered part of the mainstream school curriculum.

Teaching and learning of school Environmental Science, well that is in the syllabus. It's the teaching of the normal school curriculum...So it's the normal duties of the teacher to be able to teach that subject area. So that aspect doesn't need any funding at all.

(Education Officer (Science), Province B, personal communication, September 9, 2004)

However as Ogunyemi (2005) stated, and from the nature of activities observed in case study schools, during the present study EE and ESD calls for new processes of instruction, oriented towards action for sustainability. The principles of sustainability require immediate application to reinforce, extend and demonstrate gains. This requires additional funding to establish the necessary structures for effective EE and to support those structures. My study of the Environmental Education Policy and Strategies revealed an expectation that this additional funding should come from sources outside the fiscals. Evidence for this comes from 'Actions' proposed in this policy document for meeting Objective 6 of the nine objectives for sustainable development in the Formal Education Sector. This objective is *'To identify and mobilise resources to initiate self-sustaining EE activities'*. Such actions

1. Seek ministries' commitment to EE.
2. Identify donors and seek funding for EE activities.

(MoET, 2004, p.13)

The policy is explicit in that there should be collaboration within and between sectors for the achievement of national goals in EE. This is embodied in the following recommendations for meeting the objectives for sustainable development within the Formal Education Sector:

- Build on EE activities being undertaken by various organisations.
- Identify donors and seek funding for EE activities.
- Facilitate cooperation and coordination among EE stakeholders.
- Involve institutions of education in public awareness events together with local authorities and NGOs.

(MoET, 2004, pp. 11-13)

It is important that government creates funding from the fiscals earmarked for specific EE targets. These funds should be accessible by all partners in EE provision, including the ENGOS. Presently there is very limited funding available from within the country to fund the activities of VOs in EE. This is evidently a minor source and generally not well known to voluntary organisations. Only one of the three environmental voluntary organisations interviewed mentioned knowledge of, or having accessed such funding:

The government has assisted us. Last year the Department of Natural Resources gave WEZ a grant of about two million (Z\$) ... but not much really, to run our environmental quiz. We also got some through the President's Fund ... This money comes from the Lotto, but the president is the patron of Lotto and decides which organisations to give money to annually. We were selected as one of the organisations that benefited (in November 2003).

(WEZ Representative, personal communication, September 3, 2004)

Clearly the reliance on external donor funding is perilous to the sustainability of programmes. The MoESC to date waits for ENGOS to approach them with proposals for partnerships. Now that there is an EE policy and strategies document that specifies the

need to work in partnership, ENGOs have expressed an eagerness to see MoESC taking the initiative in this arena and to approach other stakeholders to create desirable partnerships to meet specific mutual goals. Non-governmental Organisations are smaller organisations, more flexible and are able to have great impact on a large turf with far less resources than would be available to a Government department. In the new national policy ENGOs, Government agencies, government departments, local institutions and the private sector have committed themselves as partners in EE provision and will have to collaborate in more complex partnerships whose primary purpose should be the provision of an adequate resource base for EE in the country.

PROGRAMMES

What follows is a list of programmes dedicated to EE and others that only have a component of EE that are running in Zimbabwean schools. Different Provinces run different programmes within their schools, so do different schools within those provinces. The table below lists all the programmes mentioned by the seven responding provinces out of the nine surveyed at the beginning of this study. These programmes were obtained from the completed postal survey or otherwise mentioned in the LEA follow-up interviews.

Table 6.1 Environmental Education Programmes in Zimbabwe's Provinces

Programme description	Number of times cited by respondents
Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) Science Exhibitions (organised by ACTION)	*****
Schools and Colleges Permaculture Programme (SCOPE)	****
Tree Growing and Tree Care (TGTC) competition OR other afforestation initiative	***
Environment Africa's Enviro-Action Schools competition	**
Environmental Science primary school syllabus	**
Policies on Environmental Management in schools (POEMS)	*
School Club activities	*
School tours to places of environmental interest	*
HIV/AIDS programmes	*
Participatory Agricultural Curriculum for the Environment (PACE)	*

All programmes, except School Club activities, School Tours to places of interest and PACE, are examined in detail below and within the case study reports of individual Zimbabwean schools. The TGTC Competitions have not been described in detail because, due to insufficient time during fieldwork, I was unable to meet a representative of the Forestry Commission for an interview on the subject.

ACTION

ACTION is an NGO established in Zimbabwe in 1987 to stimulate interest and debate in environmental and health issues in schools and the immediate communities within Zimbabwe and the wider SADC region. As an organisation it is involved in several activities. Those related to EE include materials production, integrating EE into teaching and learning using action research and CAMPFIRE Science Exhibitions.

Materials production

ACTION has a materials development section that produces magazines, posters, and pamphlets in the field of environment, health, education and development. The

organisation also facilitates the production of similar materials by others in the field. Materials development is backed by research into how such materials may be made accessible to target users. The process brings together all stakeholders involved in the issue. They agree on key messages on the subject, based on their expert knowledge. This leads to the publication of sample materials that are piloted before being finalised for mass production.

Integrating EE into the teaching and learning

ACTION is using the integration of EE into teaching and learning as the foundation of training teachers to move beyond transmissive teaching to become facilitators of the learning process. The organisation has been doing it as action research in the primary and secondary schools of selected areas.

Because we believe that they train to teach, but we believe that when you teach, what you tell them (learners) is what they will have. But we believe a learner, if you teach them how to learn, then they will learn for the rest of their lives.

(Director of ACTION, personal communication, September 3, 2004)

This strategy is based on a particular value.

We believe that people champion their own change, that we cannot change them, but we can only facilitate their own change...

(Director of ACTION, personal communication, September 3, 2004)

This can only be facilitated if they are given the opportunity and forum to do so.

ACTION sees the empowerment of people so that they take responsibility for their behaviour and actions as an important goal in its organisation. It aims to use teachers to facilitate the integration of schools with their communities. The intention is for the community to take ownership of the schools, while at the same time these community schools lead in development, modelling such development for the community.

Funding

ACTION has been fortunate enough to have donors who fund most of the issues that the organisation is concerned with. Community Funding, a UK based organisation has been matching all funding that ACTION manages to raise from other donors. The Swedish International Development Agency (SIDA) has also provided funding for almost all the projects that ACTION has been doing in the country.

Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) Science Exhibitions

I will begin this section by discussing the reasons behind the launching of the CAMPFIRE programme. About 12% of present day Zimbabwe is protected as conservation areas or National Parks. Some animal species have prospered so much in the protected areas that they are causing serious environmental damage to these areas and surrounding communal lands. Many local people were evicted from their homes when the Parks were created. Most now live in the surrounding communal lands. Much of this is arid and semi-arid land that covers almost half of Zimbabwe. These local people are no longer permitted to hunt the animals and harvest the plants now found inside protected areas. However, animals frequently roam outside Park boundaries, destroying crops and killing livestock and sometimes people. In the past this has created much conflict between local people and National Park staff, often resulting in illegal hunting, and in locals cooperating with foreign poachers who hunt for commercial gain. Local people had come to consider wildlife as a source of agony. The Communal Areas Management Programme for Indigenous Resources (CAMPFIRE) was begun in the mid 1980s. Designed and managed entirely by local people it encourages local communities to make their own decisions about wildlife management and control. Its aim is to help people manage natural resources so that plants, animals and people all benefit (Murry, n.d; CAMPFIRE, 2005). A group of organisations under CAMPFIRE act as service providers. These are:

The Department of National Parks and Wildlife Management deals with policy issues regarding the programme.

- The Department of Natural Resources harmonises natural resources management legislation.
- The World Wide Fund for Nature (WWF) deals with technical issues such as ecological surveys and quota setting.
- The University of Zimbabwe conducts socio-economic research on behalf of the programme.
- NGOs provide training, monitoring and evaluation, participatory rural appraisals, extension, and international lobbying and a
- dvocacy.
- The Forestry Commission promotes the conservation of forest resources within CAMPFIRE districts.

(Hanyani-Mlambo, 2002)

Mr. T. M. Moyo, then Education Officer in charge of Environmental Science in Matebeleland North, began Science Exhibitions in 1987. No doubt the idea has its roots in the *Young Scientist Exhibitions* that were common before Zimbabwe's independence in 1980. He approached donors and eventually secured funding from the Zimbabwe Trust who agreed to fund the competition at provincial level only in the form of prizes and transport and subsistence for participating pupils. Facilitators were identified from ACTION and the organisation was requested to assist with the training of teachers from the CAMPFIRE districts. Matebeleland North region tasked ACTION to devise ways of encouraging teachers to involve learners in environmental exploration, through these projects done in schools and communities (Bhunhu, 2001). The first workshop to be funded by the Zimbabwe Trust was held in 1993 and the teachers went back and put words to action and in 1994 the first Science Exhibition was held and was attended by officials from the Curriculum Development Unit (CDU) as well. The exhibits were generally impressive and funds were secured (Officer, Matabeleland North Province,

personal communication, September 9, 2004). The programme has become almost a permanent feature of the region and every year teachers are identified for training. The idea was to have at least a teacher *per* school attending the training workshops. Structures for the workshops were set up from the school, the cluster, district and provincial levels.

The focus of the Matabeleland North Science Exhibitions was to make the pupils aware of their environment; analyse local situations and problems, ask questions about why they are as they are, and find solutions to local problems (Bhunhu, 2001).

ACTION, at the request of regional education authorities, has facilitated the development of CAMPFIRE Science Exhibitions in several other educational districts. The educational style and structure of the exhibition aims to contextualise science education around community needs together with an associated changing balance in favour of process rather than product. ACTION's strategy and capacity building interventions include the professional training of teachers, teacher trainers and judges in problem-solving and science process skills related to collections, investigations and design and technology (Murry, n.d).

Since it began in Matabeleland North the CAMPFIRE Science Exhibition has been spreading gradually to other CAMPFIRE districts. They are presently running in four provinces. These are Matabeleland North and South, Mashonaland Central and Manicaland.

The first Mashonaland Central CAMPFIRE Science Exhibition was held in July 1997. Mashonaland Central Province and particularly Guruve District within that province, is home to one of the four case study schools that were studied as part of the present research.

Since 1997 Guruve Districts has taken part every year in the Exhibitions. A constitution, developed to govern CAMPFIRE Science Exhibition activities regularises the formation of District Management Committees. These are responsible for running Exhibitions in their districts. They have a mandate to pull together necessary resources through subscriptions from member schools and funding lobbied from the donor community.

While being trained to assist pupils carry out their projects for CAMPFIRE Science Exhibitions, teachers are taught to assist pupils devise projects that respond to the real problems in the community. Hence teachers need to understand how to identify and analyse problems so pupils do not dwell on symptoms. Secondly as research has shown that teachers tend to regard community's problems as different from their own (Mupfuni, 1997), teachers are trained to identify themselves with the problems in the community

Funding

The United States Agency for International Development, an NGO called Zimbabwe Trust (ZIMTRUST) and ACTION have been funding all Guruve District CAMPFIRE Science Exhibitions competitions. Funding involves the buying of prizes such as trophies, shields, books and ACTION T-shirts, as well as providing transport to and from competition and workshop venues.

ACTION also works in partnership with CAMPFIRE through Rural Councils that are part the consortium of organisations that form CAMPFIRE. Rural Councils assist the Science Exhibitions, often ferrying pupils from their district to the venue of the Exhibition.

Local structures that have been put in place support the Exhibitions. These include CAMPFIRE Science Exhibitions District Committees. These Committees have a mandate to pull together resources through collecting subscriptions from member schools and lobby for funding and support in kind from the local and donor community.

They are responsible for running the competitions for schools in their districts. ACTION funding is received only for convening Exhibitions. All other activities are funded at district level through fund-raising activities at that level. Schools also pay cluster level subscriptions that fund inter-school competitions within those clusters. Winners of these competitions proceed to represent their cluster at district level. Schools are motivated to participate because, 'they see the point' and schools enjoy the whole excitement of getting together with other schools and participating.

WILDLIFE ENVIRONMENT ZIMBABWE

Wildlife Environment Zimbabwe (WEZ) is a membership based registered Private Voluntary Organisation, founded in 1927. Membership consists of individuals, families and corporations that care for the future of Zimbabwe's environment, its wildlife and its people (WEZ publicity pamphlet). WEZ's goal is:

To encourage and assist all people in Zimbabwe to understand the importance of our wildlife and the environment to the well being of current and future generations and to ensure that the utilisation of the natural resources is fair and sustainable.
(WEZ publicity pamphlet).

Wildlife Environment Zimbabwe is a multi-faceted organisation, that approached its goal through a range of different activities: wildlife management, EE, field activities related to animal protection and rescue, research, networking and publication. It has an EE programme that focuses on primary schools based at five Environmental Education Centres. These centres are located in Kariba, Chiredzi, Kwekwe, Fort Rixon (Shangani) and Karoi. The education centre in Kariba is called the Kariba Environmental Education Programme. It covers Kariba District which includes Kariba town, Omay communal lands all the way up to Nyami Nyami. The Kwekwe Environmental Education Programme (KEEP) covers Kwekwe, Slobela and Zhombe, while the Fort Rixon Environmental Education Programme (FREE) covers Insiza and the farms around the Shangani area. In Karoi the programme, called the Hurungwe Environmental Education Programme (HEAL) and FREE are currently suspended due to lack of funding. The Chiredzi programme is called the Low Veld Environmental Education Programme

(LEEP). This covers the whole of Chiredzi and areas around Gonorezhou National Park (See Plate 16 for a map of the districts of Zimbabwe and Plate 17 for the national parks and conservation areas).

Plate 16 The Districts of Zimbabwe.

Wildlife Environment Zimbabwe is a membership-based organisation that operates on a branch system. Each education centre used to be controlled by a branch. Each branch had a branch chairman, secretary and a committee. Most of these branch members were commercial farmers. There are 11 branches in total. So some centres had the support of more than one branch. However this, for reasons discussed later in this section, changed in 2000.

library, offices and accommodation for visiting schools. This includes dormitories and campsites for Bush Camps. Chiredzi has an office only. Hippo Valley Sugar Estates, Triangle Sugar Estate and Malilongwe Wildlife Conservation Organisation all assist the education centre in Chiredzi with accommodation and other facilities that the centre needs to carry out its education programmes with children. These organisations also donate prizes for specific EE programmes run by the education centre. Assistance is given by these organisations through their Environmental Departments, these organisations having accepted the challenge to give something back to the community. This came as a result of lobbying by WEZ during which the plight of rural children was highlighted.

The problem WEZ seeks to address

Rural communities are faced with many environmental problems that are linked to poverty. These include deforestation, poaching, siltation, etc. These communities lack knowledge on how they can benefit from their wildlife-rich surroundings. The WEZ EE programmes focus mainly on rural schools close to national parks and wildlife conservation areas. Previously these national parks and conservation areas were in effect closed to the local population. While of course they, like anybody else, were equally free to visit these parks and conservation areas it is often the case that visitors have to drive in, and therefore would require a vehicle. Further there is charge at the gate for entry, and for local populations this charge would be prohibitive. At the same time the animals were crossing the fence into the communal areas, destroying crops. Yet locals were not allowed to kill them to defend their crops or benefit in any way from the same wildlife.

The need for communities living near conservation areas to benefit has been realised in Zimbabwe and besides the WEZ programme, CAMPFIRE is another programme that works together with local communities in wildlife rich areas in conservation efforts that ensure that local peoples benefit as well from the resources in their environment. WEZ on its part has enlisted the sympathy of commercial farmers, sugar estates, and the administrators of these conservation areas and parks. They not only assist with logistics

as needed by WEZ EE centres to run their programmes, but also with prizes for specific programmes. At the Chiredzi Environment Centre, which is particularly successful, this support has included scholarships for winning pupils to proceed to whatever level they are capable of going in their education. Some pupils are sponsored to attend the Leadership Development Programme at the Chimanimani Outward Bound School which is located in the eastern highlands of Zimbabwe. This is testimony of the importance to successful EE of successful partnerships.

WEZ Environment Centre activities

Each centre's activities are different and aimed at local problems. Centres work with local schools through Environmental Education Clubs. A volunteer teacher, called a Club Patron, runs each club. The programme involves approximately 200 pupils. An Education Officer runs each education centre. These Education Officers are former teachers. Besides being a focal point in leading the rest of the school to take part in essay writing and prepared speech competitions around an agreed environmental theme, these Clubs are the hub of income generating projects such as bee-keeping, nursery, nutrition gardens and fish-farming. Such projects soon spread from the school into the communities. Competitions begin at school, to cluster, and then district level, with winners of one level proceeding to represent their school, cluster or district at the next level. Only one, the Wildlife and Environment Quiz Competition goes up to national level.

Funding

WEZ's Environmental Education Centres are funded separately. Each centre deals with different environmental problems, and because of the wide geographical spread, of their programmes around the country, donors prefer to fund specific centres, and therefore specific issues. The German Development Service (DED) is the main donor of the programme, and other organisations 'chip in'. SIDA sponsors attendance of all WEZ Education Officers (EOs) to courses such as the Rhodes Certificate in Environmental

Education, run by Speciss College, Harare in collaboration with Rhodes University, South Africa, and other SADC EE courses.

Local level support for WEZ's EE programmes comes from its branch members, many of whom represent commercial farms in each Environment Centre's catchment area. Most of the Environment Centres are well equipped for carrying out their EE programmes, with a library, museum, offices and accommodation. However in the case of Chiredzi, which only has offices, local support is received from Hippo Valley Sugar Estate, Triangle Sugar Estate and Malilangwe Wildlife Conservation Organisation. These organisations provide accommodation and donate prizes for competitions run by WEZ EE programmes. These include book prizes for group winners of activities such as drama competitions. Malilangwe Wildlife Conservation Organisation gives study bursaries to winning pupils in poetry, speech writing, etc; while still others are sent for leadership training at Chimanimani Outward Bound School.

Problems the programme is facing

The land resettlement programme, which began in 2000 in Zimbabwe, displaced most of the WEZ branch members, effectively breaking up the structure of the branches. Further, some external western donors pulled out their support in protest to the land resettlement programme. Whilst this affected some of centres, Karoi and Fort Rixon were so severely affected that operations at these centres have been suspended. With the break-up of branches all responsibility for the centres has fallen to the WEZ head office in Harare.

MUKUVISI WOODLAND, WILDLIFE AND ENVIRONMENTAL EDUCATION CENTRE

Mukuvisi Woodland, Wildlife and Environment Education Centre is a private voluntary organisation. It is a membership paying organisation, run by a council which has a secretary, chairman, treasurer and a committee. It is based at the Mukuvisi Woodlands, just 10 minutes drive from Harare City Centre. This woodland site is on lease from the City of Harare. Initially woodland only the site now boasts an impressive variety of big

and small animals, including giraffe, antelope, ostrich, impala, zebra, crocodile and tortoise. The objectives of the Centre, as summarised in its publicity brochure (n.d), are:

- To protect this area of natural Miombo Woodland for the enjoyment and education of people in Zimbabwe.
- To educate children and teachers by creating an awareness of the environment, both in an urban and rural context.
- To provide a secure, relaxed atmosphere for families to enjoy nature.
- To provide access to more in-depth information about our wildlife heritage for those who require it.

The Centre also has an Estates department that manages the infrastructure, grounds and animals. The second objective covers EE involving schools and is the primary concern of the description of the activities of the Centre that follows. The description is based on the results of a one-to-one interview with the Education Officer of the centre.

Environmental education of school children is centred on educating those from urban primary and secondary schools on habitat and lifecycles of various animals and plants in a way that relates to the Zimbabwe Environmental Science Syllabus. The rationale for this is that urban children often do not get a chance to learn about and experience nature first-hand, as children from rural areas would. The Centre also reaches out to one of the local communities. Specifically this is Epworth, a deprived peri-urban area not far from the woodlands.

As well as the Mukuvisi Woodland, Wildlife and Environment Education Centre, the Mukuvisi Woodlands are also the site of the following associations: ACTION, CAMPFIRE Association, Zimbabwe Orchid Society, Wildlife and Environment Zimbabwe National Office, and the Wildlife and Environment Zimbabwe Mashonaland Branch.

Environmental education activities run by the Centre include giving talks to visiting schools on topics teachers would like covered. This is often complemented by a general tour of the woodlands, during which learners can ask questions. Sometimes Centre staff accept invitations from schools to give talks, though this is less common because the Education Centre does not have enough staff to do many outreach visits of this nature.

The Centre also organises quiz shows as well as drama shows for both primary and secondary schools. In most cases the quiz and drama shows have a theme that is biased towards the environment. The Centre writes invitations to schools to participate. Those that accept congregate at the Centre on given dates and different schools compete. Prizes are given as incentives for participation. Funding for these activities relies on local corporate institutions. Delta Company and Coca Cola have contributed prize money. Eversharp, a company that manufactures stationery, often donates pens and rulers. Local food companies contribute food for the woodland bush camps organised by the Centre during school holidays. These are normally four days long and cater for 6-12 year olds. Bush activities include star gazing, animal tracking, night walks, fishing and special talks by volunteer experts.

The Centre has recognised a need to produce a curriculum that links to various aspects of relevant school syllabi. Although some groundwork has been done, lack of funding has stalled progress and the idea is currently shelved. The programmes in general are funded from gate takings for woodland tours, as well as individual and corporate membership fees, hiring out the Centre's Enviro bus, and hiring out the Centre's lecture rooms and other meeting areas. The Netherlands Embassy funded the construction of the Education Centre. The Centre's Enviro Bus (battery powered) and truck were bought by the GTZ through the DED.

THE SCHOOLS AND COLLEGES PERMACULTURE PROGRAMME (SCOPE)

The SCOPE Programme in Zimbabwe works through school and college communities and supports organic farming and sustainable agriculture both in principle and material

terms. The SCOPE Programme is a unit of the Zimbabwe Institute of Permaculture (ZIP), which works in partnership with the Ministry of Education in the area of Environmental Education. It is an environmental education Programme that uses Permaculture and an Integrated Land Use Design (ILUD) as tools for sustainable environmental management (SCOPE Programme, 1997), promoting healthy environments and sustainable production or land use. The Programme seeks to provide educational institutions with a design tool or process to develop integrated land use management systems on their grounds. In addition it works to develop an environmental education curriculum that is centred on building an understanding of, and application of the Ecological principles on which sound land use practices are based.

A committee whose members are drawn from the Ministry of Education and the Zimbabwe Institute of Permaculture manages the Programme, while a full-time Co-ordinator reports to the committee and implements policy. The Ministry of Education provides support through office accommodation and communication channels and the ZIP provides personnel, funding and forward planning. Other supporting units include the Fambidzanai Training Centre, Natural Farming Network (NFN), Participatory Ecological Land Use Management (PELUM) and Association for Farmers of Organic Research and Training (AfFOResT) (Nyika, n.d, unpublished programme document).

The Mission of the SCOPE programme is to facilitate participatory and sustainable land use management within schools and colleges and their surrounding communities. The programme also wishes to develop and integrate permaculture principles into relevant curricula (Nyika, 1998). The programme seeks the following:

- To develop a process for use in the design of school and college grounds.
- To assist schools and colleges to develop and implement the permaculture process in primary and secondary schools.
- To produce curricular materials in support of the programme.
- To promote co-operation with government agencies and other non-governmental organisations working on the same field.

- To incorporate elements of the ILUD process in primary and secondary schools.
(Nyika, 1998).

The programme's motto is: "*Schools, colleges and communities in sustainable land-use management*" (Nyika, 1998).

Permaculture (derived from the two words, 'permanent' and 'agriculture') is an approach to sustainable agriculture that was developed in Australia in the 1970s. Permaculture is the conscious design and maintenance of agriculturally productive ecosystems which have the diversity, stability, and resilience of natural ecosystems (Makovere, n.d). Mollison (1990) considers permaculture as the harmonious integration of landscape and people providing their food, energy, shelter, and other material and non-material needs in a sustainable way. He based this on a philosophy of man working with, rather than against, nature: of protracted and thoughtful observation, rather than protracted and thoughtless action; of looking at systems in all their functions, rather than asking only of yield from them (Mollison, 1990, p.255).

Permaculture is an approach that looks at the land as a whole and *designs* agriculture very carefully, placing components so that they work together, creating a network of *useful connections*. For example a chicken may fertilise a fruit tree with its manure while it feeds on the fruit of the tree and also breaks the lifecycle of some of the pests of that fruit. Likewise the water from the roof of a house is caught in pits to grow plants to feed people in the house and keep the house cool and protected from winds and hot sun, the plants themselves benefiting from the protection and reflected heat of the house. In other words permaculture observes nature's patterns and aims to create a similar interconnected whole through good design, planning and management, but with species useful to us (Introduction to Permaculture Design, author unknown, n.d).

The principles of permaculture evolve around methods for designing ecological communities and restoring urban/suburban centres into areas that are locally self-reliant. While permaculture embraces the above principles, it is a solution-oriented design

strategy, perceiving site problems and 'limitations' only as design opportunities.

Permaculture is an integrated concept that centres on the interconnectedness of all things that make up each particular design (Mukovera, n.d).

The history of the SCOPE programme in Zimbabwe

In 1989, teachers from St Vincent's Secondary School (in Ruwa, a semi-rural settlement on the outskirts of Harare) having observed permaculture at Fambidzanai Training Centre requested from the management of the Centre to participate in the permaculture programme for schools. Staff at Fambidzanai Training Centre worked with the school to introduce a basic land use design process. By 1991 St Vincent Secondary School had been set up as the first working example of Integrated Land-Use Design (ILUD) of school grounds in Zimbabwe. In the same year when the then Minister of Education, Fei Chung, observed and was impressed by the activities happening at this school, she directed ZIP to work with the CDU to develop a suitable programme so that more schools could benefit from the experience of this school. The Ministry recognised that schools had no systematic process to design and manage their land in an integrated way and in a way in which there could be involvement of staff, parents, and learners. The programme was then endorsed through a letter of formal support written by the then permanent secretary in the Ministry of Education in August 1992.

St Margaret's Primary School was the first primary school in Mashonaland East Region to be selected to take part in this programme. It was one of 18 schools selected to take part in Phase One of the three-phase pilot of the now consolidated SCOPE programme. The permaculture programme was piloted in three phases. In the first phase, which was carried out in 1994, one primary and one secondary school from each of the nine Ministry of Education Regions (these have since been reorganised into Education Provinces) were selected to participate in the project. As part of the activities of this phase seminars and workshops were held for staff at all levels, from selected teachers at participating schools to Deputy Regional Directors of Education. Implementation workshops were held at each of the 18 schools and a process to produce a facilitators

book on the ILUD was initiated. During this phase the programme was housed at the Natural Farming Network (NFN) which is another unit of the ZIP (Wilson, 1998).

An independent evaluation of this phase which was carried out in 1995 concluded that 'the Programme had, in a short space of time made a profound and beneficial effect on most of the schools and the people actively participating and as such should definitely be continued' (Nyika, 2001a). It was noted that most of the pilot schools were experiencing marked positive changes in productivity and stability of their grounds. This evaluation recommended that the programme in the next phase be expanded to involve at least one school in each district in the country. Another key recommendation was that other practices which contributed towards ecological agriculture such as minimum tillage, agroforestry, appropriate technology and the sustainable use of natural resources should be incorporated into the programme which would also expand into colleges. A serious need for training and information exchanges between all the parties involved in the programme was also highlighted.

The programme entered its second pilot phase in January 1997 when it became an independent unit of the ZIP and a full time coordinator was appointed. The main activities of phase two were:

- Strategic planning for the three year third phase.

- Review seminars for Regional Directors and Deputy Regional Directors

- Workshop on the facilitator's book.

- Familiarisation visits to the Regional Offices and the 18 phase one schools.

- Selection of the additional 36 schools and three Colleges to join the next phase.

- Production of a logo for the programme.

(Kapuya, 1997)

The third phase of the programme extended from August 1997 to August 2000. The programme then worked with 54 schools (an additional two primary and two secondary schools from each of the country's nine regions had joined the programme. A pilot

programme for colleges was introduced with two Teacher Education Colleges. In the year 2000 St Margaret's Chigodora Primary School in Wedza and Ntepe Secondary School in Gwanda emerged as outstanding working examples to other schools and programme managers of sustainable land use management. Another independent evaluation during the same year hailed the overall success of the SCOPE Programme and chronicled its achievements and limitations. In 2001 an additional 72 new schools joined the programme bringing the total to 126 participating in the SCOPE Programme. More work was also done to integrate permaculture principles into the curricula and to produce relevant materials. All the teacher education colleges and colleges of agriculture set to join the programme. By this time six international organisations were working in partnership with the SCOPE Programme (Kapuya, 1997).

FUNDING FOR ENVIRONMENTAL EDUCATION PROGRAMMES

The core funding for Environmental education programmes that are run by voluntary organisations is from external donor organisations. This is discussed in those sections of this thesis, e.g., case-study reports, that deal specifically with the activities of these voluntary organisations. However the extent to which this funding trickles down to real activities within the schools is debatable. In the present study I found that there is a great shortage of resources within some schools taking part in voluntary organisation sponsored EE activities. For example, one of the case-study schools, Mahuwe Primary School, is taking part in the Policy on Environmental Management for Schools (POEMS) programme. This involves the school in nutrition garden, orchard, nursery, and HIV/AIDS activities, among others. The irony is that these voluntary organisations do not provide gardening tools (watering cans, hoes, hosepipes, etc) for carrying out activities and pupils have to bring these from home. The HIV/AIDS club has no teaching and learning aids. This problem has been recognised by some provincial offices:

Because we have situations where you have an organisation coming. They excite you so much you want to participate. In the end there is no funding. For example, we had a programme for youth. We were assured that the programme would, among other things, be involved in the operations of vegetable gardens, operations of orchards, propagation of shrubs. But when it came to the operational ability of the programme it was not realistic. They had promised us that there would

buy seeds, they would buy insecticides, they would buy our schools wheelbarrows, watering cans, and so on. When we said where are these things? There was not a wheelbarrow, not a watering can. (Deputy Provincial Education Director, Province C, personal communication, August 31, 2004)

The other issue, linked to the trickling down of funding to the 'grassroots', I witnessed firsthand when I attended one of the Provincial CAMPFIRE Science Exhibitions. The primary school children participating produced tremendous work from minimal locally available resources in all the various competition categories. The competition and judging process is very rigorous and for presentation purposes project reports were written with painstaking neatness on manila. Schools would have travelled often long distances from different districts throughout the province, to attend the competition. At the end the prizes for winners were negligible sums of money for individual pupils and certificates for the school. For me personally, it was heartbreaking. One of my respondents commented:

...Then we go to a provincial function and what do we find, the school is given a certificate, and a book worth Z\$45 000 (\approx £1.10), or maybe a book worth Z\$23 000 (\approx £0.55). But if you work out the cost of moving the teachers and the pupils from the venue, you find its more expensive to the school. Sometimes these cooperating partners don't even agree to fund the travel. So when you find such a situation you ask, 'What is your budget for this function?' And they say, 'Z\$1 000 000', and you say, where is the money going? The same people end up being the beneficiaries, not the targets of the programme.

(Deputy Provincial Education Director, Province C, personal communication, August 31, 2004)

For me this is a good case for more and better partnerships. The organisation (ACTION), which funds these Exhibitions would do well to create partnerships that would, among other things, assist with prizes. How well this can work is evidenced by the operations of WEZ at their Chiredzi Environment Centre. Compared to other WEZ Environmental Education Centres this Centre is the least equipped, yet through working in partnership with local stakeholders is the most successful.

School Club activities are funded by the schools themselves, as are School Tours to places of interest, which may be environmental. Environmental education activities that fall within the teaching of school Environmental Science are considered to require no additional funding:

Teaching and learning of school Environmental Science, well that is in the syllabus. It's the teaching of the normal school curriculum... So it's the normal duties of the teacher to be able to teach that subject area. So that aspect doesn't need any funding at all.
(Education Officer (Science), Province B, personal communication, September 9, 2004)

ISSUES GUIDING ENVIRONMENTAL EDUCATION PROVISION IN ZIMBABWE

The standing policy in Zimbabwe is that anyone or any organisation wishing access to schools and Ministry of Education (MoE) personnel for research, projects, etc., has to receive clearance from the Policy Research and Development Unit at the MoE head office, Harare. This involves making a presentation about what the programme is all about, its target population, and how it will benefit the Ministry. If it involves a programme to be rolled out in schools, the Policy Research and Development Unit send the application to the CDU. If the CDU decide that the activities of the proposed programme fit into the broad framework of the MoE, they endorse it, and communicate this to the Policy Research and Development Unit. If this Unit is satisfied they will give permission, on behalf of the MoE, for the programme to run. They communicate this to the relevant sectors within the Ministry, encouraging them to cooperate and participate as appropriate.

After receiving this communication provincial education offices cooperate and in-turn encourage their schools and teachers to participate. Each of Zimbabwe's nine provinces is divided into districts and there are a total of 58 of these. Provincial Education Offices do not have the authority to choose not to allow their schools and personnel to participate once MoE Policy Research and Development Unit have granted permission for a project or research to be carried out in that province.

The size and population of Zimbabwe means that specific EE programmes can cover only certain parts of the country, not all. Some EE programmes are tailored for specific types of areas. For example CAMPFIRE Science Exhibitions take place in the rural schools of CAMPFIRE areas. These are areas that are found close to national parks and

wildlife conservation areas. The extent of the reach of other programmes, e.g., the SCOPE programme, is limited by funding. Although a lot more schools may want to become involved after observing the benefits, once their capacity has been reached SCOPE organisers advise such schools of other channels available by which they too can become permaculture schools.

Different schools within provinces and indeed within districts in those provinces run different EE programmes. Several reasons were identified for this variation. For example:

(But) the main cause of non-participation could be lack of interest, or lack of information, or lack of money... and because some schools can be very far away from others.
(Deputy Provincial Education Director, Province A, personal communication, September 10, 2004)

The availability of certain resources to support some programmes is critical. For example if a school is to embark on certain tree growing and tree care activities it would need a readily available and reliable source of water. Schools located in arid areas, and which do not have adequate pumping facilities to access sufficient ground water, would therefore find participation in such activities difficult, and may opt-out of participating. Schools in Vumba, a good Region One rainfall area, on the other hand can easily begin and maintain gum tree plantations. Further, some schools are remote from others within their district. In the MoE schools within districts are divided into clusters which are the first point of group activities, such as Science Exhibitions. Winners of cluster level competitions proceed to represent their cluster in district level competitions, etc. Great distances between schools within a cluster prohibit cluster level activities.

Certain schools are very poor. You are struggling to get textbooks; you are struggling to get pieces of chalk for your teachers to do normal teaching. You wouldn't then burden your teachers by saying, 'now lets get a bit of funds to purchase this and that (for an EE programme.)'
(Education Officer (Science), Province D, personal communication, September 15, 2004)

Despite being resource poor some schools are resourceful and take up income generating projects that, as well as having an EE aspect, are also income generating. The level of teacher interest seems to be an important factor in programme uptake by schools.

...these programmes in most cases are run by fairly newly qualified teachers from these colleges, who have actually gone through the programme during their college training. ... Now those who are not mounting these programmes its largely because of teachers who belong to the old school. They are scared of things that have to do with science, and research to them doesn't make any sense at all.

(Education Officer (Science), Province B, personal communication, September 9, 2004)

The Provincial Education Offices and the District Office encourage schools to participate in permitted programmes running in their areas, but the final decision as to whether a school participates or not rests with the headteacher and the school.

BELIEFS GUIDING THE PROVISION OF EE

My study has revealed several principles and beliefs and values that guide the provision of EE in Zimbabwe. Below these are identified together with substantiating statements from authoritative MoE personnel. Purposive sampling strategies used in the present research provide a limited number of case studies for examination (Patton, 2002, p. 563). The limitations of time, personnel and resources means that only a proportion of possible and agreeable respondents were asked to give in-depth face-to-face interviews. Thus the extent to which views presented below are commonly held in the country has not been fully established. Respondents are however authoritative in the field and the present research assumes that theirs are authoritative views.

Environmental education is part of national policy implementation:

It is part of national policy. We don't generate other ideas. We follow and we implement national guidelines.

(Deputy Provincial Education Director, Province C, personal communication, August 31, 2004)

There is a need to educate for responsible citizenship:

We are not producing children for merely being able to read and write, and so on. We are producing individuals who will go back to their communities and they need to be responsible members of the community. And in a way we have to educate the whole human being so they can actually be responsible people...

(Education Officer (Science), Province B, personal communication, September 9, 2004)

There is a need to educate for environmental awareness:

You want people to be aware of their environment. You want people to appreciate their environment.

(Deputy Provincial Education Director, Province A, personal communication, September 10, 2004)

There is a need to educate for environmental conservation:

Environmental Science is very important because it teaches conservation. The resources that we have are very important and children need to learn at a tender age that our resources are important and not to be used carelessly.

(Education Officer (Science), Province D, personal communication, September 15, 2004)

You want people to be able to solve problems in their environment. You want them to coexist with their environment. That means using resources in a beneficial manner, not in a disadvantageous manner.

(Deputy Provincial Education Director, Province A, personal communication, September 10, 2004)

The values of most of the NGOs interviewed who are working in the field are embodied in their mission statements. ACTION believes firmly that people are the owners of the resources in their environment, and as such have decision-making rights regarding those resources. They believe that the welfare of the people comes first, and the people should utilise the environment in a sustainable manner while in pursuit of their welfare.

We also believe that people champion their own change, that we cannot change them, but we can only facilitate their own change...

(Director of ACTION, personal communication, September 3, 2004)

THE WILLINGNESS OF SCHOOLS TO PARTICIPATE

Authoritative stakeholders interviewed during this national survey have the following impressions about the willingness and ability of schools to participate in these programmes:

Teachers within schools are as much as possible allowed the choice to participate in programmes that are of interest to them and there is a lot of time during the primary school day for project work. The school day finishes around noon when pupils break for lunch. From 2pm co-curricular activities begin, while other pupils have sports, others do projects. Afternoon activities end at 4pm Monday to Thursday in rural schools, and the school closes at noon on Fridays. In my experience, urban schools have a different timetable with a less intensive co-curricular programme.

Schools can only work with these (EE organisations) as additional to their own load. ... During the normal teaching time we will not give these organisations special leeway and say to our teachers, now stop teaching and listen to SCOPE for example. But what happens is in the afternoon, when schools are having a breather, for instance when they are having co-curricular activities, ... (Deputy Provincial Education Director, Province C, personal communication, August 31, 2004)

Most of the projects are considered possible within the resources ordinarily available to schools. An example is the CAMPFIRE Science Exhibitions for which expenses are available only during competitions. In some schools EE projects are now considered part-and-parcel of normal school activities, and are not considered onerous.

THE BURDEN OF NEW INITIATIVES

Several other initiatives are taking place in schools. These include: tuck shops, cross-word puzzle quizzes, feeding projects, art competitions, HIV/AIDS programmes, health and hygiene activities, social clubs, kindness clubs targeted at sensitising young people to the needs of animals such as cats and dogs, etc. Nevertheless none of the interviewees considered there to be an overload of initiatives in the schools. Various reasons were given for this. First these initiatives do not take place in all schools. Some schools have no initiative taking place outside the normal school curriculum. Further the present political climate in Zimbabwe means that donor funding for initiatives has fallen significantly.

There was a time when there was a lot of pressure, because we had a lot of NGOs who wanted to fund this type of activity and that type of activity and so forth and so forth. Including UNESCO, UNICEF ... All that has sort of gone down.

(Deputy Provincial Education Director, Province A, personal communication, September 10, 2004)

Then we have another one in Fort Rickson. The Fort Rickson Environmental Education programme, FREE. It covers Insiza, and it also used to cover the farms around Shangani area. But we have (also) suspended operations, because we were being funded by farmers there. But when some of their farms were taken for land resettlement they were not very happy about it. So they decided to pull off their support from us (WEZ Representative, personal communication, August 26, 2004).

THE EXTENT TO WHICH PROGRAMMES IN PRIMARY SCHOOLS ARE REFLECTED IN SECONDARY SCHOOLS

Programmes running in primary schools in general are not reflected in secondary schools in Zimbabwe. This stems from the fact that some programmes from the onset target primary schools. An example is the CAMPFIRE Science Exhibitions. When such programmes begin it is common for a lot of resources are poured into them initially. Consequently MoE personnel at all levels, as well as schools are given the opportunity of experiencing first-hand the benefits of participation. This results in 'buy-in' at all levels. Once such buy-in has been accomplished programmes may survive a cut in NGO funding and be sustained through local level support and voluntary contributions at all levels, including schools themselves. For secondary schools on the uptake, who have not experienced the euphoria of donor funded success and seen the benefits of the programmes, it becomes very difficult to withstand the crippling financial constraints that are part of the terrain in carrying out such programmes (Education Officer (Science), Province B, personal communication, September 9, 2004).

Some EE activities may take place in Science Clubs in secondary schools. In some provinces it is compulsory for each secondary school to have a Science Club. This research did not investigate the content of activities in these Science Clubs, or to what extent such clubs exist in secondary schools countrywide.

In Binga and Lupane there is a pilot scheme to involve secondary schools in CAMPFIRE Science Exhibitions;

Because we have been saying, what's the use of developing the talent of pupils up to Grade Seven and then they come to Form One its forgotten forever? So Binga and Lupane are our pilot schools, and they were also funded by our donor (ACTION).
(Deputy Provincial Education Director, Province A, personal communication, September 10, 2004)

To introduce the next Chapter I will say at this point that as was the case for the Scottish context, the study of Zimbabwe takes a nested case study approach. The national survey presented in this chapter sets the context for the in-depth case study of two schools and the subsequent case study of individual EE programmes within those schools. The two schools, selected as a result of recommendations by authoritative figures in the field are Mahuwe Primary School, a rural school in Zimbabwe's Guruve District, and St Margaret's Primary School, a rural school in Hwedza District.

7 THE ZIMBABWEAN CASE STUDIES

CASE STUDY 3: MAHUWE PRIMARY SCHOOL

INTRODUCTION

Mahuwe Primary School (see Plate 18) formerly known as Kadzi, a subsidiary of Musengezi Primary, opened in January 1990. The school is located in Ward 7 of the rural Mid-Zambezi Valley Area of Guruve District in the Mashonaland Central Province of Zimbabwe.



Plate 18 Mahuwe Primary School, Wedza.

THE PROBLEM BASE

The problem base in Zimbabwe

In Zimbabwe, the macro-political setting during the colonial period resulted in the majority of the country's farmers being concentrated on less than half of the country's agricultural land, most of which was agriculturally marginal (Moyo, Robinson, Katerere, Stevenson & Gumbo, 1991). This means that the communal farmers have been cultivating land that is not suitable for that purpose and in the process land degradation has resulted. In addition high population densities resulted in increased pressure on the marginal land and this further compounded the problems of erosion and poverty. Land degradation is a serious problem in the communal areas of Zimbabwe (Whitlow, 1989). Thus the problems faced by most school communities, especially those in communal areas include:

- A highly degraded land resource base with falling productivity;
- Declining water resources due to reduced infiltration, increased run-off and siltation;
- Deepening poverty, which is worsened by inappropriate farming practices;
- Deforestation and shortages of wood fuel;
- Livestock threat to crops and overgrazing;
- A seasonal rainfall pattern in which no rain is received during the greater part of the year;
- A climatic pattern characterised by variations in the total annual rainfall received and periodic droughts;
- The HIV/AIDS pandemic has brought untold suffering by disrupting family life and taking away the breadwinners.

(Nyika, 2001b)

Problem base at Mahuwe Primary School

The school is located in an area of low and erratic rainfall. Semi-desert conditions prevail during the greater part of the year. These climatic conditions exacerbate the

poverty that is inherent in this rural area. The cultural background of the area is rife with traditional beliefs that disadvantage girls' access to education (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004).

ENVIRONMENTAL EDUCATION AT MAHUWE PRIMARY SCHOOL

Environmental education at Mahuwe Primary School is 'five-pronged'. The school takes part in three competitions: the Tree Growing, Tree Care (TGTC) Competitions that are run nationally by the Forestry Commission, the Enviro-Action Schools Competition, and since 1997 Guruve District as a whole has been taking part in the CAMPFIRE Science Exhibitions which are competitive. Further, each year around mid-September, the school organises an environmental clean-up day as part of the Clean Up The World - Clean Up Zimbabwe Campaign. School pupils from Grades 1 to 7 as well as school members of staff, pick up litter in and around the area of Mahuwe Township identified by the school's organising committee as the subject of the clean up that particular year (see Plate 19). The school's programme is supported by donations from local business people and companies. The school uses this occasion for community outreach by inviting the participation of the Mahuwe police, other surrounding schools, and interested organisations such as the Agricultural and Research Extension Services (AREX), local business people, Councillors and volunteers from the community (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004).

After the event the school writes a report which it sends to Environment Africa. Environment Africa is the coordinating organisation for the Clean Up the World Campaign in Zimbabwe. This global campaign was initiated by the Australian yachtsman Ian Kiernan in his native country, and has spread to more than 125 countries worldwide with an estimated 40 million people taking part in the campaign. It has become the tradition for Environment Africa to facilitate the campaign in Zimbabwe. The Clean Up Zimbabwe Campaign was launched in 1993. Each year it grows from strength to strength with more and more individuals, community groups, local authorities and companies taking part every year. The main objective of the campaign is

to raise the level of stakeholder awareness on the need for a cleaner and healthier environment that improves Zimbabwean quality of life. The Campaign seeks to initiate dialogue and local-local partnerships among all stakeholders including business, civil society, government and the community in reducing the levels of pollution in the country (Hartnack, 2003).



Plate 19 Students and teachers from Mahuwe pick litter for the Clean Up Zimbabwe Campaign.

(Source: Mahuwe Primary School archives.)

Mahuwe Primary School's association with Environment Africa has led to the school taking part in the Enviro-Action Schools Competitions (see p.251) that are organised annually by Environment Africa. Through this association Mahuwe Primary School became one of 24 interested schools that are taking part in a pilot project to develop school-based environmental policies and management plans (POEMS). This scheme was designed to use the environment as infused cross-curricula themes for formal, non-formal and informal education.

The Rationale for Competitions

Competitions provide an opportunity for learners to get public recognition for the work they are doing. They are also an opportunity to share work and ideas, and to learn from

others about what they are doing. Increasingly competitions are being seen less as competitive interaction, and more as seminars for interchange. Team entries encourage group work among learners, and often the emphasis is on sharing rather than competing, though some competitions offer exciting prizes (Makuwerere, 2004).

Science competitions help learners understand and apply the technological process to solve problems and satisfy needs and wants. Other outcomes that can be achieved through project and competition work include access, process and use of information from a variety of sources and situations. If a group of learners enter a competition this allows them to use skills and display attitudes and values that improve relationships in family, group and community. So competitions can be linked to various learning areas right across the school curriculum (Makuwerere, 2004).

ENVIRONMENTAL EDUCATION PROGRAMMES

For the purposes of the present study I interviewed the headteacher, the deputy headteacher, the school teacher who is the EE coordinator, and five teachers, each responsible for one of the following within the school Audit Zone activities for the POEMS programme: *nursery, orchard, nutrition garden, HIV/AIDS awareness, and pollution and control*. I was given a guided tour of *Dyarai Miti*, the first Community Nutrition Garden that was started as a result of the school's modelling (see Plate 20 and Plate 21). I took photos, and copied some existing ones of this and the school EE sites and requested appropriate programme documentation. The list of documents used to verify and complement interviews and observation may be found in Appendix .

Information obtained from the documents, interviews and observations was analysed to describe important predetermined aspects of individual EE programmes that constitute a linear logic model. These aspects are described in Chapter 3 (Methodology and Research Design). The Linear Logic Model, drawn for the various EE programmes running at Mahuwe Primary Schools and their resources and prior functions, may be found in Appendix V.



Plate 20 Dyarai Miti Community Nutrition Garden. Mahuwe.



Plate 21 Community members at work at Dyarai Miti Community Nutrition Garden. Mahuwe.

What follows is a description of the various EE programmes running in the school, with Programme Theory providing an organisational framework for the presentation of individual EE programme information.

Communal Areas Management Programme for Indigenous Resources Project (CAMPFIRE) Science Exhibitions

Guruve District has been participating in the Science Exhibitions (see Plate 22, Plate 23 Plate 24) since the Guruve District CAMPFIRE Science Exhibition Programme was officially launched in 1997 at Guruve Primary School. The launching was done in consultation involving the Mashonaland Central Regional Education Office, the donors: USAID, ZIMTRUST (Zimbabwe Trust, an NGO) and ACTION (Guruve District CAMPFIRE Science Exhibition Constitution, 2000). The rationale for this launch was to prevent the collapse of the increasingly popular exhibition programme following the withdrawal of USAID funding which was imminent. The Management Committee's mandate was to pull resources together through contributions from member schools, and funding from the donor community (Guruve District CAMPFIRE Science Exhibition Constitution, 2000). The training of teachers and facilitators started in 1996 at Bindura Primary School with the facilitating team coming from Matabeleland North. Several donor charities (including USAID, ZIMTRUST and ACTION) have been funding Guruve District CAMPFIRE Science Exhibitions competitions. The funding involved the buying of prizes such as trophies, shields, books and ACTION t-shirts, as well as transport to and from competition and workshop venues (Guruve District CAMPFIRE Science Exhibition Constitution, 2000).

Since 1997 each year the Guruve District (where Mahuwe is located) has won either first or second place or both at provincial and inter-provincial levels of the competition (Headteacher, Mahuwe Primary School, personal communication, September 28, 2004).



Plate 22 A Mashonaland Central CAMPFIRE Science Exhibition. July, 2004.



Plate 23 Pupil representative presents a groups' project to judges during the CAMPFIRE Science Exhibition. Mashonaland Central. July, 2004.

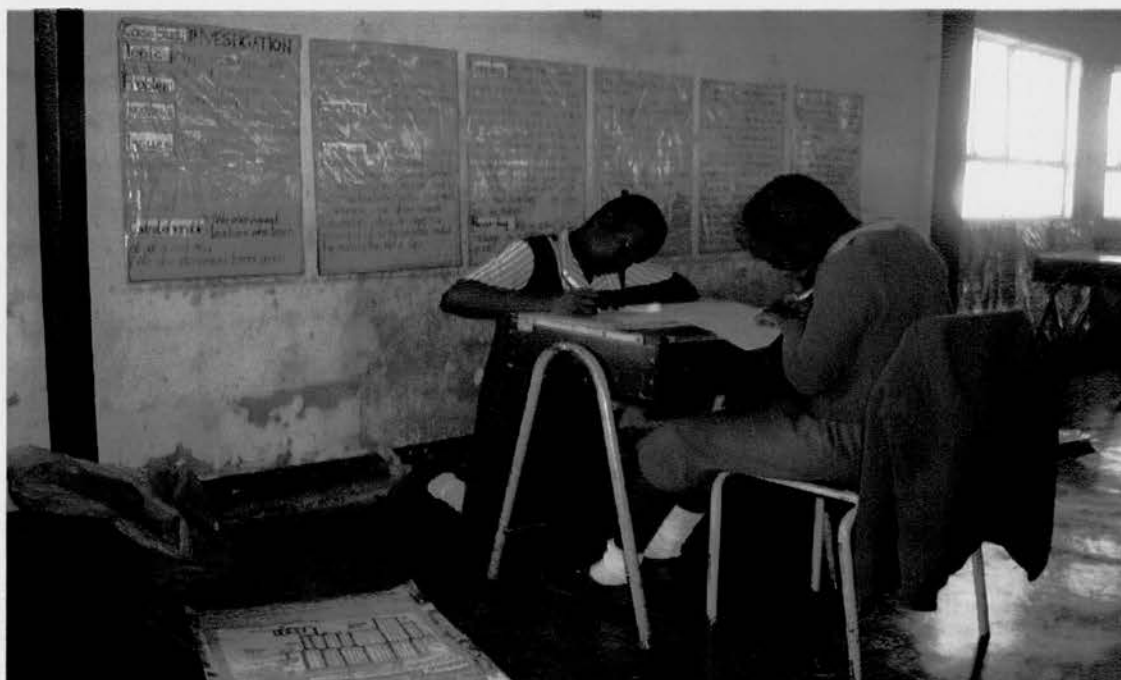


Plate 24 Pupils duplicate their projects at the request of interested stakeholders. Mashonaland CAMPFIRE Science Exhibition. July, 2004.

Programme Organisational Theory

This is made up of the CAMPFIRE programme's objectives, services it provides and its resources and prior functions. The programme's objectives and services are presented below, while its resources and prior functions are presented in Appendix V.

Programme Objectives

Pupils and exhibitors will:

- Be aware of their local environment
- Use and care for the resources in their local environment
- Identify local community problems and solve them using local materials and resources
- Develop creative and innovative ability
- Appreciate other people's culture through study of different projects in different categories
- Develop scientific skills

- Link learning to life

(Source: Guruve District CAMPFIRE Science Exhibition Constitution, 2000)

- Identify and seek solutions to the problems emanating from the environment by designing simple technological devices
- Investigate ways of recycling resources
- Take effective action towards management of natural resources
- Be aware of their environment through collections
- Analyse local situations and problems and ask questions of why they are as they are.

(Source: Mupfumi, 1997; Bhunhu, 2001)

The Services that the CAMPFIRE Exhibition Programme will provide

The organisation ACTION, at the request of regional education authorities, has facilitated the development of CAMPFIRE Environmental Science Exhibition in several educational districts of four Provinces. Its strategy and capacity building interventions include the professional training of teachers, teacher trainers and judges in problem-solving and science process skills related to collections, investigations and design, recipe and technology. Establishing democratically elected cluster and district committees and providing these members with training in administration and financial management, in order that the capacity for sustaining the programme is built at the local level, is a key strategy. As a result professional teacher institutions have been established in more than 21 districts, each with their own constitution, elected representatives and bank account. Rules and procedures have been developed and committees are beginning to identify, plan and budget locally not only for their science education In-service Teacher Training (INSET) needs but also for CAMPFIRE Science exhibitions held at a 'cluster' and district level (Murry, n.d).

While being trained to assist pupils carry out their projects for CAMPFIRE Science Exhibitions, teachers are taught to assist pupils come up with projects that will be responding to the real problems in the community (see p.215). Trained teachers at their schools guide pupils in:

Collections

The focus of these is to make pupils aware of their environment (Mupfuni, 1997). A Collection is the systematic gathering of materials and information for a specific purpose, and classifying and analysing them (Bhunhu, 2001) and teachers assist pupils identify topics with an environmental message. The findings must have an impact on the community. Hence the way the findings are displayed for public scrutiny/consumption is very important. The findings must trigger people in the community to take action. Pupils are guided to make collections in an environmentally friendly, and safe manner.

The Environmental Science syllabus looks at collections as a way of teaching Environmental Science by making pupils aware of things that are in the environment. Collections can also be done for other learning purposes. Pupils can collect seeds that can be used as counters, or maybe for planting in the nurseries. A Material or a Non-material Collection may be done for the purpose of the Science Exhibition. Under Non-material Collections pupils can collect ideas and beliefs, for example collecting folk stories that are related to the environment, that are within their own communities. Under Material Collections they can collect examples of pollutants that are within their immediate environments, or a variety of grasses growing within their area and maybe knowledge of the uses of those grasses (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004).

Investigations

This Science Exhibition category involves pupils in asking questions about why people, other animals or plants behave the way they do, with the purpose of establishing trends in actions and behaviours and what these mean (Bhunhu, 2001). Through investigations pupils analyse local situations and problems and ask questions about why they are as they are (Mupfumi, 1997). For example, pupils may enquire into the high rate of failure in the school, or why a lot of fish in a particular stream are dying. As far as possible the pupils will be looking at things that affect the environment. Children are made aware that there is the biophysical environment, the social environment and the economic

environment. Pupils may investigate issues affecting any of these aspects of the environment. For example, making an alternative to coffee using a locally available source may result in people in the local community actually taking this up commercially. For the purpose of the Science Exhibition investigations may be one of three different types: case study, survey, and experiment.

Design, Recipe and Technology

This is a science exhibition category which involves pupils in identifying problems around a theme; suggesting several problem-solving alternatives; planning and designing the construction or production of tools or substances before choosing the best tool or substance that can solve a problem in a community (Bhunhu, 2001, Mupfumi, 1997). The aim of this category is to find solutions to local problems in the community.

Children begin by identifying a problem within the community. They may, for example, identify that cooking oil is difficult to access in the community and children may then attempt to make a substance that can be used as a substitute, using resources that are available in their local environment. An example is the use of Marula Tree nut that contains a seed that is oil rich, as an alternative source of cooking oil. Or children may make a simple gadget that can be used to solve a local environmental problem. For example in a cotton growing area where traditionally people pack the cotton into bales by physically going into the bale to compress the cotton, children have designed a simple gadget that presses cotton down in the bale during packing. Children have made soaps, alternatives to coffee beverages and so on under this category. Pupils actually surprise even their teachers at how well they do in projects for these competitions when given the opportunity. Because some of the pupils' inventions may actually have commercial value, ACTION encourages the school to go to the police and have them rubber-stamp their inventions before the school goes public about them (Headteacher, Mahuwe Primary School, personal communication. September 27, 2004).

After having completed their projects pupils write a report, and prepare an exhibition. The process develops participating pupils’ skills in graph drawing and interpretation, English writing and speaking, handwriting, as well as presentation skills. These projects also touch on various other topics that pupils meet in their formal school subjects. Pupils in the Science and Research Zone of the POEMS (see p.253) school project who carry out projects entered for these science exhibition competitions have reportedly excelled in their other school subjects (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004).

ACTION funds the Science Exhibitions, beginning at Cluster, District, Provincial, and Inter-provincial level. Prizes for Cluster and District level competitions are funded from funds raised by Districts themselves. If they are unable to raise enough funds for these, they inform ACTION who then forward a funding request to Zimbabwe Trust on behalf of the district.

What follows is a presentation of the impact theory for the CAMPFIRE Science Exhibition (Figure 7.1). As explained in p.108 the temporal sequencing of components in the impact theory is used in the present study as an analytical tool highlighting important issues regarding the real and projected impact of the individual EE programmes. All impact theories drawn for EE programmes at Mahuwe Primary School are the basis of the analysis of the summative impact of the school’s EE programmes presented on p.265.

Key for Figure 7.1 (p.250)

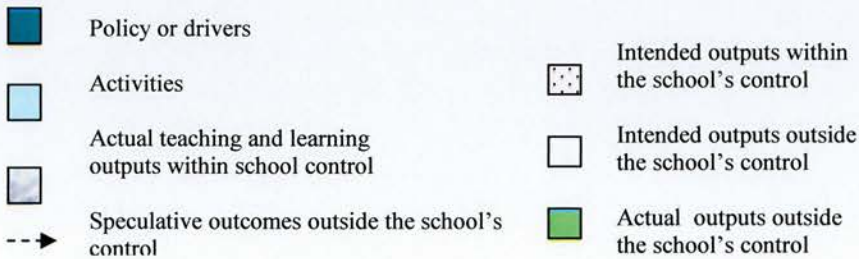
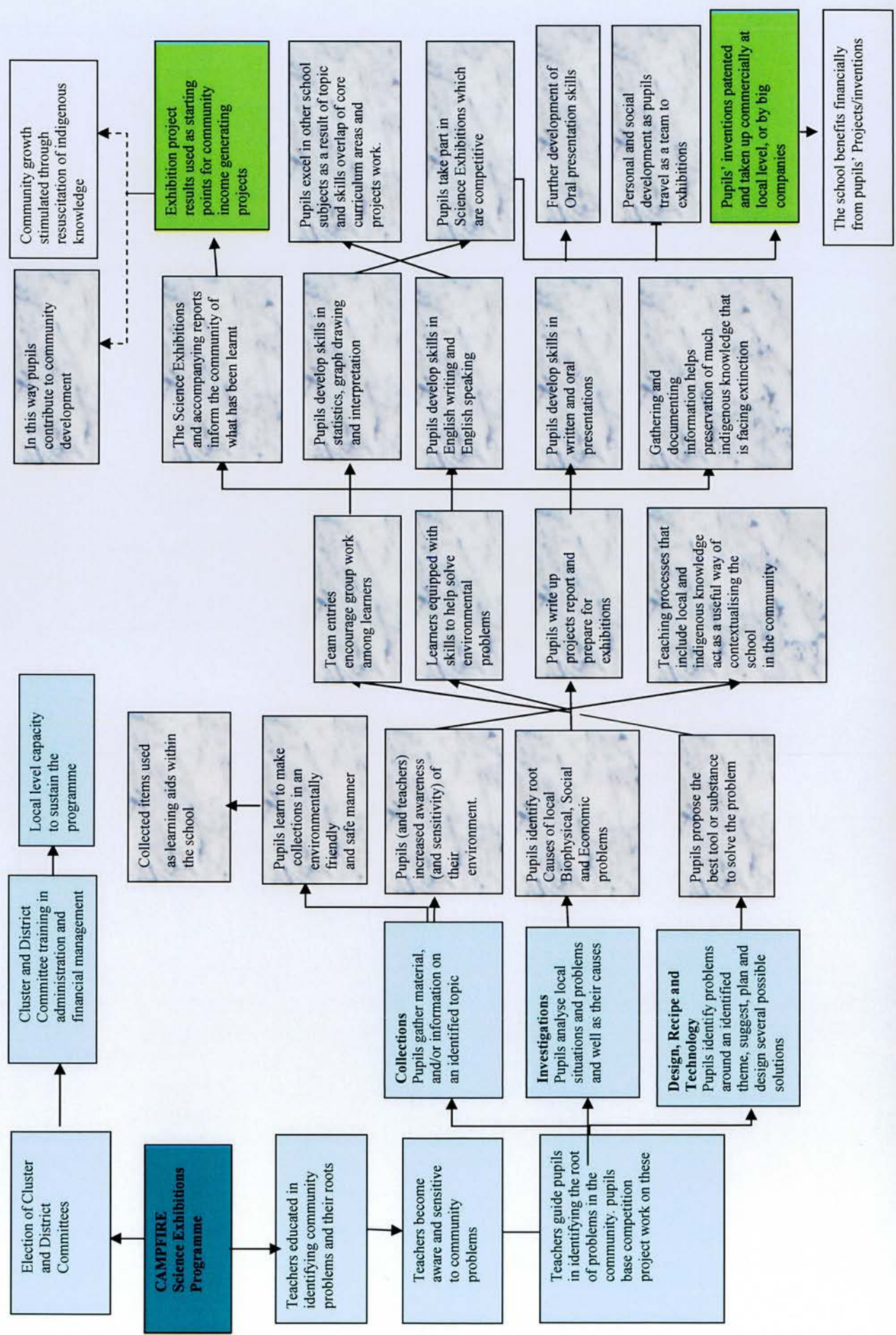


Figure 7.1 Mahuwe Primary School Communal Areas Management Programme for Indigenous Resources Science Exhibitions – Impact Theory



The Enviro-Action Schools Competition

The Enviro-Action schools competition is a project of Environment Africa whose aim is to encourage school children to contribute in their small way to a better environment that leads to a better life for all. The competition has received support from the Ministry of Education, Sports and Culture and from the Department of Natural Resources (DNR), Forestry Commission and the Better Schools and Better Environmental Science Teaching (BEST) Programme. The competition started in 1994 when it was known as 'You and Your Environment Competition'. It assumed its current form in 1997 and so 2004 represents the 8th year the competition has been running in its present form (Enviro-Action Schools Competition, 2004 flier).

The competition encourages pupils to undertake practical projects that enable them to study and understand nature and acquire a deeper understanding of the interdependent web of life. It is based on the premise that each human being is a unique and integral part of the Earth's community of life. Accordingly therefore everyone has a special responsibility to care for life and its diverse forms. Teachers and pupils are encouraged to 'create a caring attitude' and behave in a way that promotes a new awareness of the whole environment to bring positive change to the community and society as a whole. This competition allows the school to contribute in its own way to a better environment and indeed a better future for all (Enviro-Action Schools Competition, 2004 flier).

Programme Organisational Theory

This is made up of the programme's objectives, services it provides and its resources and prior functions. The first two are presented below. The programme's resources and prior functions are presented in Appendix V.

Project Objectives

Pupils will:

- Study and understand nature
- Acquire a deeper understanding of the interdependent web of life
- Highlight environmental problems in their community
- Be part of community environmental problem solving

(Enviro-Action Schools Competition, 2004 flier; Makuwerere, Programme Officer (Schools), Environment Africa, personal communication, August 23, 2004).

Services that the programme will provide

Annually Environment Africa will sit down with the Ministry of Education Curriculum Development Unit (CDU) and agree on three themes for the competition which runs in both primary and secondary schools. Environment Africa will then produce competition entry forms and the Ministry of Education will produce a circular that accompanies these entry forms to the schools. The competition entry form will give general information about the competition. This information will include a brief history and aims.

Mahuwe Primary School's Science and Research Environment Club (formed under the school's POEMS programme) identifies an environmental problem in the community related to one of these themes and will write projects that can then be entered into the competitions. Teachers guide and supervise pupils in undertaking practical projects that enable them to study and understand nature and acquire a deeper understanding of the interdependent web of life. The school sends the project documents to Environment Africa through the CDU. A team of EE practitioners from across the spectrum will then mark the projects and prizes will be presented to winners at the Annual AGM.

(Mahuwe Primary School has won the Enviro-Action Schools competition at national level three times (1999, 2000 and 2002). In 2003 the school was third at national level) (Headteacher, Mahuwe Primary School, personal communication. September 27, 2004).

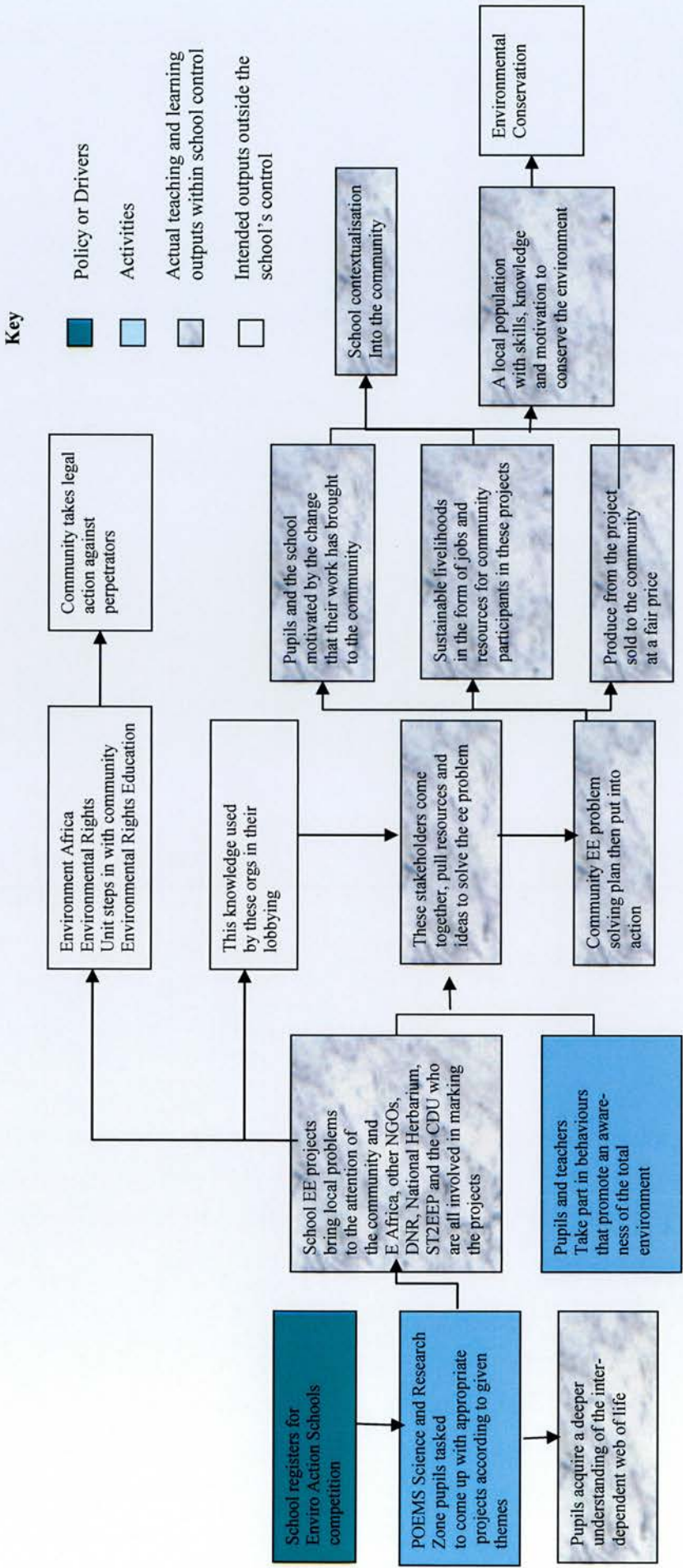
Figure 7.2 shows the Impact Theory for the Enviro-Action School Competition at Mahuwe Primary School.

The Policy on Environmental Management for Schools (POEMS) Programme

In 2002, Environment Africa forged a partnership with the Ministry of Education, Sport and Culture (MoESC) to work with 24 interested schools from three regions in Zimbabwe, on a pilot project to develop locally relevant school-based environmental policies and management plans which are integrated in the overall curriculum. These regions were Bindura in Mashonaland Central Province, Hwange North District, Victoria Falls urban in Matebeleland North Province, and three districts in Manicaland Province. Schools were selected on the premise of demonstrated potential for innovative growth and development, and were willing to embark on the pilot project on a voluntary basis. The project was designed for implementation in primary (7-13 years) and secondary schools (14-19 years). This partnership had the blessing of the Ministry of Education's Curriculum Development Unit (CDU). The POEMS programme was designed to use the environment as an infused cross-curricular theme for formal, non-formal and informal education. The process approach adopted included networking with all major stakeholders in EE, and pooling resources, and coordinating approaches. Environment Africa also managed to attract a donor (the Canadian International Development Agency - CIDA), who pledged to finance the pilot project which began in 2002. The POEMS project was designed for implementation in primary and secondary schools (Environment Africa, 2003).

In February 2002 a sensitisation workshop was held with Heads of schools and their District Education Officers to obtain their support. In the same month staff developments were conducted for school-coordinators and their assistants, and an implementation framework was agreed upon.

Figure 7.2 Mahuwe Primary School Enviro-Action Schools Competition - Impact Theory



From March 2002 onwards each school then embarked upon a policy development process, according to their audited and prioritised needs. Environment Africa and the Ministry of Education provided back-up and extension (Environment Africa, 2003). This backup extension service included Technical Skills Training Workshops as the need arose. Once a term 'Convergence meetings' were held for schools in different regions to provide a forum for sharing experiences, review progress and exchange ideas. In November 2002 a Final Review workshop was done to evaluate the impact of POEMS in schools and communities and recommend a way forward for MoESC (Environment Africa, 2003).

Several schools embarked on excellent initiatives and projects, which included involving communities in their project work at school and replication in the community outreach; manufacture of corrugated roofing sheets from waste plastic; action research on industrial pollution of rivers; and adoption of nearby schools into the programme. The schools then compiled their experiences for presentation to the Ministry of Education as recommendations for mainstreaming Environmental Education (EE) into the curriculum. Experiences showed that the buy-in of school heads is essential for success; and that schools have a great potential and capacity as centres for innovation, action research and community development (Environment Africa, 2003).

Makuwerere (2004, pp. 13-17) outlines the way the POEMS Project guides activities within each participating school. The project guides teachers to appoint an environmental education coordinator and convene an environmental education working group which makes an audit of the school environment. This is essentially a process of identifying and prioritising the areas in terms of need, which leads into a decision on what the school Audit Zones will be. A Zone Leader is appointed for each zone from the Working Group. Teachers and pupils in the school are then divided into the different Audit Zones. Selection is random for all Audit Zones except the Science and Research, which takes only the top performers from each class in the school. This is followed by the publication of a draft policy statement and action plans for the selected Audit Zones. This is the responsibility of each Audit

Zone team led by the Zone Leader in collaboration with the community. Working Group members are also responsible for recruiting other learners, educators and community members into their respective Audit Areas. Action Plans developed within School Audit Zones are implemented, evaluated and then periodically reviewed.

The implementation process requires the different audit teams to hold regular meetings and these act as monitoring and control tools. The working group is supposed to hold regular meetings where progress reports are given by the different audit teams. The coordinator reports to the school head's office so that the administration is appraised of the progress in implementing the school environmental education process. Each audit area maintains an audit book that has the audit policy, action plan as well as the diary of activities for the audit area. The school administration through the coordinator regularly calls in the audit books for inspection and encouragement.

As a result of the introduction of POEMS Mahuwe Primary School has developed a school vision, and motto as well as an environmental management policy.

The school's vision regarding the environment is: *To conserve, preserve, develop and utilise the environment in a friendly and sustainable manner*. The school's motto regarding the environment is: *Conserve the Environment, Save Life*. And finally the school's Environmental management policy is: *To provide pupils and community with quality and relevant knowledge and skills in environmental management for sustainable resources utilisation* (School file on the POEMS Project at Mahuwe Primary School).

Further to this the school has developed a list of their values. These they have identified as: Conservation, Communication, Community Service, Utilisation, Sustenance, and Preservation. The school's environmental education and environmental management activities are based on these.

They have also come up with Audit Zones or Departments. These are decided on by the school and depend on the environment in which the school is located (Makuwerere, 2004). The following are the Audit Zones at Mahuwe Primary School are: Nutrition Garden, Nursery, Orchard, Plantation, Health and Sanitation, Science and Research, HIV and AIDS Awareness, Resources Utilisation, Biodiversity, Pollution and Control (School file on the POEMS Project at Mahuwe Primary School).

Programme Organisational Theory

This is made up of the programme's objectives, services it provides and its resources and prior functions. The first two are presented below. The programme's resources and prior functions are presented in Appendix V.

Objectives

Environment Africa's project implementation objectives:

- To sensitise educators and heads of schools,
- To equip school coordinators with knowledge and skills needed to implement their policies and action their plans,
- To impart technical skills to teachers and pupils, to be able to implement projects of their choice,
- To assist schools to document the process of their cases.

(Environment Africa, 2003)

Services the programme will provide

Beyond the activities directed by the POEMS programme (see p.255) a general evaluation of the programme is done periodically at Mahuwe Primary School. This involves the whole school moving around, visiting each zone to see what they are doing. They observe and give comments. Audit teams are given an opportunity to share the problems they are experiencing. The rest of the school gives suggestions for improvement.

The Science and Research Audit Zone at Mahuwe Primary Schools serves to groom pupils to carry out projects that are entered for the Enviro-Action Schools Competition and CAMPFIRE Science Exhibitions.

Useful skills that are learnt by the pupils and teachers are passed onto the community through the school's community outreach activities.

Figure 7.3 shows part of the impact theory for POEMS activities taking place at Mahuwe Primary School. Table A.2, Figure A.1 and Figure A.2 showing impact theories for other POEMS activities taking place at Mahuwe Primary School are presented in APPENDIX V. All impact theories drawn for EE programmes at Mahuwe Primary School are the basis of the analysis of the summative impact of the school's Permaculture programme presented on p.265.

Figure 7.3 Mahuwe Primary school POEMS Programme
- Impact Theory: Part 2

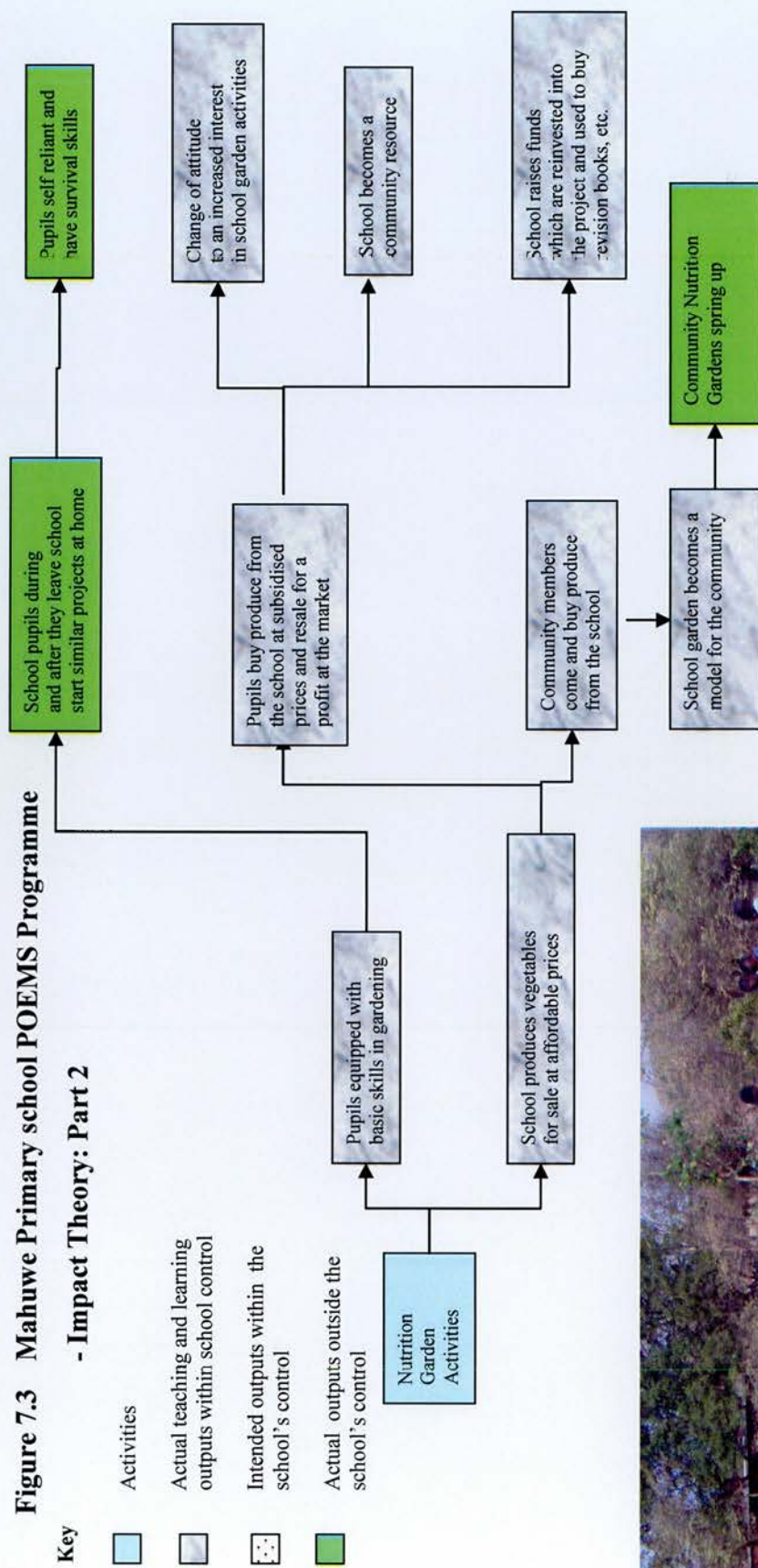


Plate 25: Mahuwe Primary School pupils and teachers working in the school Tree Nursery.



AN ANALYSIS OF CONTEXTUAL IMPERATIVES FOR ACTION AT MAHUWE PRIMARY SCHOOL.

This section will present the drivers that impel Mahuwe Primary School (specifically) to take part in the EE programmes it does take part in. A similar section describing the imperatives driving St Margaret's Primary School are given on p.276. Because the two schools are located 400km apart it is necessary that no assumptions regarding the similarity or otherwise of such imperatives be made in the first instance. A summation of the imperatives for participation in both Zimbabwean case study schools is given on p.304 which also contrasts these with imperatives governing participation in the Scottish case study schools.

Ministry of Education Imperatives

An Education Officer in charge of Environmental Science began the Science Exhibitions, in 1987. Through the Ministry he approached donors to secure committed funding for the programme. He also sought partnerships with the NGO ACTION to assist with training teachers in CAMPFIRE districts to supervise pupils and to run the exhibitions. Ministry of Education officers at provincial and district level encourage schools in all CAMPFIRE regions where the CAMPFIRE Science Exhibitions take place to participate.

For the CAMPFIRE Young Science Exhibition, schools have no excuse whatsoever for actually not taking on board this programme. So we are driving towards persuading each and every school to participate so that really all the children are exposed to the skills which they would actually get from this programme (Province B District EO, Science, personal communication, September 8, 2004).

This CAMPFIRE Science Exhibition is a home-grown programme that has impressed provincial education authorities and school authorities and teachers. Thus at the request of these provincial education authorities the programme has been expanded to several educational districts in the country. Schools participating are so committed to the programme that they contribute financially to the holding of the Exhibitions through paying subscriptions through local CAMPFIRE Science Exhibition Committees. The schools also fund the projects that the pupils carry out for the Exhibitions.

Although schools are encouraged to participate in the Science Exhibitions it is not compulsory for them to do so. The reason being that several variables have to come together favourably to allow for the participation of a school in the exhibitions. These include the presence of trained and willing teachers, resources, and motivation.

Academic imperatives

Schools are highly motivated to take part in the CAMPFIRE Science Exhibitions because they perceive an impact of participation on the academic performance of the pupils. The programme's impact theory (see p.250) gives a graphical summary of the development of various skills, e.g., statistical, graph drawing and interpretation skills (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004). Preparation for and presentation at the Exhibitions develops problem-solving and Science process skills, handwriting, English writing and speaking, and written and oral presentation skills (Bhunhu, 2001). Teachers believe that as a result participating pupils excel in other school subjects due to topic and skills overlap of core curriculum areas and projects done for the Science Exhibition.

Values

The value that underlies the CAMPFIRE Science Exhibitions is that;

It is important to involve pupils in projects involving conservation of natural resources, as they are the future custodians of these natural resources (Provincial Chairman for Mashonaland Central Province Opening remarks during The Third Mash Central CAMPFIRE Co-ordination Meeting/Planning workshop. Mazoe Chibhanguza Hotel, 1999).

This underlying value has no doubt influenced the activities and intended outcomes of pupils' participation. 'Collections' lead to increased pupil awareness and sensitivity to their environment. 'Investigations' lead to pupils identifying root causes of local biophysical, social and economic problems. 'Design, Recipe and Technology' projects lead to pupils planning, designing, and then proposing the best possible solution to local problems (Mupfumi, 1997; Bhunhu, 2001; Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004).

The participation of school pupils in projects resulting in the conservation of natural resources is illustrated also in the impact theory for the Enviro-Action Schools Competition. Here the EE projects that pupils conduct bring local EE problems to the attention the community, environmental organisations and the CDU (Makuwerere, Programme Officer (Schools), Environment Africa, personal communication, August 23, 2004). This knowledge is used by these organisations in their lobbying for resources to solve these problems. These are then pooled together with resources and ideas from other stakeholders (Makuwerere, Programme Officer (Schools), Environment Africa, personal communication, August 23, 2004). The result is community problem solving.

An example is the reclamation of Katonho Gulley in Mahuwe. Pupils highlighted its existence through a project they entered for the Enviro-Action Schools Competition. The project won a national prize in the competition. Environmental Organisations and the CDU visited the area and verified the presence of the gulley as well as the pupils' estimate of its rate of growth annually. The Lower Gurusu Development Association (LGDA), Environment Africa, District Administrator (DA) and the community put ideas and resources together. The school provided tree seedlings, the DA provided Vertiva Grass, Environment Africa sunk a well at the site, provided bee hives as well as fencing. The project took off and what initially was a barren, unproductive site now produces fruit, honey and other crops, creating not an insignificant amount of wealth for those involved with the project (Makuwerere, Programme Officer (Schools), Environment Africa, personal communication, August 23, 2004; TIC of EE at Mahuwe Primary School, personal Communication, September 29, 2004). Such solutions have been shown to be sustainable primarily because they are community-based and create jobs and other valuable resources for the community. Created resources include food and water sources (Makuwerere, Programme Officer (Schools), Environment Africa, personal communication, August 23, 2004).

Another value that governs the way EE programmes are carried out in the school is:

The education system should extend to the community for it to be successful and useful. As long as any school programme is not benefiting the local communities but remains within the four walls of the classroom, then its efforts come to nought. Education to be useful must transform the lives of the people around the school (*Regional Director for Mash. Central Region. Official opening of the 6-10 January 1997 CAMPFIRE Science Exhibition Workshop for Teachers*).

This implies that schools should be satellites of new knowledge for the surrounding community. Any project that is started in the school should similarly take root and flourish within the community. This is a very deliberate drive with respect to EE programmes and projects. An example at Mahuwe is the Nutrition Garden. Its existence has sparked the development of three Community Nutrition Gardens in Mahuwe. The first Community Nutrition Garden to be established within the community of Mahuwe, *Dyarai Miti* Community Nutrition Garden (see Plate 20 and Plate 21), has done so well that it has won a national prize.

Socio-economic imperatives

The example of Katonho Gulley above illustrates also the socio-economic benefits that EE projects can produce. Mahuwe, the area in which the school is located, is a rural area, of low and erratic rainfall, resulting in semi-desert conditions during the greater part of the year. These climatic conditions exacerbate local poverty. What has become evident in the Zimbabwean situation is adequately expressed in the words of a teacher from St Margaret's Primary school when he said:

We try to create an environment so that pupils would like it, and they get something from it. If someone gets something from the environment he loves the environment. So we try to create an environment that is wanted and loved by the pupils, so that when they go home they try to keep the environment like what they see at school (*Deputy TIC for Permaculture at St Margaret's Primary School, personal communication, September 21, 2004*).

Once pupils and members of the community see benefit in conserving their environment they 'buy into' the idea (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004) and in my opinion the drive towards environmental citizenship takes a surer footing.

Consequently in Mahuwe the school Nutrition Garden, Plantation, and Orchard raising activities have similarly taken root in the community. The school established

models that the community have emulated. Active intervention by the school was in the form of free training for interested parents and members of the community. This involved a period of these parents and community members carrying out their activities within the school, until they had acquired adequate skills and located land in the community to establish their own community Nutrition Garden and Orchard (see Figure A.1 and Figure A.2). Individual activities are discouraged and these community projects are 'community' activities involving a group of members from the community. Such community projects have the advantage of attracting funding and other assistance, as well as providing greater security to members than individual projects. Funding and assistance in-kind comes from organisations such as the LGDA, Environment Africa and the local Council.

The poverty that plagues this rural area results in a high dropout rate from the formal education sector, even at all stages of the primary school. Reasons for dropout include lack of tuition fees and forced early marriages for girls. The need to teach pupils self-reliance skills is very important to the school. The rationale being that if the school cannot prevent pupils' dropping out, it can at least arm the pupil with 'survival' and self-reliance skills for use once they are outside the school. The impact theory for Orchard, Nutrition Garden, and HIV/AIDS Awareness programmes illustrates this component of the school activities.

AN ANALYSIS OF SUMMATIVE PROGRAMME IMPACT THEORY

The impact theories of the EE programmes at Mahuwe Primary School illustrate their projected effects. These can be divided into four; environmental citizenship benefits, social and community benefits, pupil personal benefits, and school benefits.

Environmental Citizenship Benefits

Using Hungerford and Volk's (1990, p. 9) definition of environmentally responsible citizens⁸ the following is an analysis of the extent to which the activities taking place

⁸ Hungerford and Volk (1990) define an environmentally responsible citizen as one who has (1) an awareness and sensitivity to the total environment and its allied problems [and/or issues], (2) a basic

at *Mahuwe Primary School* attempt to cultivate good environmental citizens both in the school and in the community. The analysis includes reference to the classification in Hungerford and Volk (1990) definition by the insertion of (1) to (5) against each activity. The characteristics included in this analysis of the development of environmental citizenship behaviour include those for which empirical evidence exists as well as others that reflect the intentions underpinning certain activities as illustrated in the relevant sections of the impact theory diagrams.

CAMPFIRE Science Exhibitions

The projects that are done by the pupils under the guidance of the teachers as far as possible dwell on issues that affect the environment.

But the definition of the environment now is very tricky. So we are now saying that the children should be made aware that we have the biophysical environment. They should also look at the social environment. That means how people relate to each other and how people relate to the biophysical environment. We also have the economic environment. This is maybe looking at the rates of poverty and unemployment and so on in a particular area. So for example if children make the beverage that I was talking about, this would help solve an economic problem in that people can actually start making this substance in the community and market it for money (*TIC of EE at, Mahuwe Primary School, personal communication, September 29, 2004*).

Through Collections pupils (and teachers) increase their awareness of and sensitivity to the environment (1, 4). Through Investigations, pupils identify root causes of local biophysical, social and economic problems (2), and through Design, Recipe and Technology pupils come up with propositions of the best tool or substance to solve these environmental problems (4, 5).

understanding of the environment and its allied problems [and/or issues], (3) feelings of concern for the environment and motivation for actively participating in environmental improvement and protection, (4) skills for identifying and solving environmental problems [and/or issues], and (5) active involvement at all levels in working toward resolution of environmental problems [and/or issues].

Enviro-Action Schools Competition

These competitions guide pupils through themes to study and understand nature (1, 2), acquire a deeper understanding of the interrelated web of life (2), highlight environmental problems in their community (4) and be part of community problem solving (5) through their suggested solutions to the problems they would have highlighted, as well as through participation in community problem solving processes. The process is illustrated in the Enviro-Action Schools Competition impact theory.

As a result of this competition the Mahuwe community has come together with other stakeholders and the school, pulling resources and ideas to solve local environmental problems. An example of this is the Katonho Gulley Project which has been detailed above.

Orchard activities

When pupils are involved in the growing and maintenance of the trees within the school, and as they begin to appreciate the benefits of such trees, they display conservative behaviour. This is demonstrated by a decline in the wanton destruction of trees and other vegetation around the school (3).

Pollution and Control activities

The activities of this Audit Zones aim to educate the community on pollution and its control and develop hygienic habits in pupils (4).

CAMPFIRE Science Exhibitions and accompanying reports

CAMPFIRE Science Exhibitions and accompanying reports inform the community on what has been learnt (5). This knowledge may be used as a starting point for community income generating projects by the pupils themselves or members of the community. In this way pupils contribute to community development (5). Sometimes this is from the use and application of indigenous knowledge. Thus, through the pupils' projects, resuscitation of indigenous knowledge results in community growth.

School leavers use knowledge on sustainable livelihoods that they gain in school during school projects to start income generating projects at home both during their school years and after (5). Some learners and community members who realise the benefits of such sustainable livelihoods have become activists within the community and with support they participate in outreach work in surrounding communities, disseminating EE (3).

POEMS

The POEMS project is a whole school project which begins with a School Audit Process. Here an Environmental Education Working Group identifies and prioritises different areas of the school in terms of need, leading to a decision of what the school audit zones will be. I suggest that this will probably lead to environmental sensitivity (1), a predictor of environmental citizenship behaviour. However the Environmental Education Working Group does not involve pupils. One could say that the pupils, once they are in the Audit Zones, will develop an understanding of the different areas of the school grounds and their needs (2). If this is the case, then pupils will develop sensitivity to their school environment. From this pupils may develop sensitivity to similar environments in their homesteads and the community.

Social and Community Development

CAMPFIRE Science Exhibitions and accompanying reports inform the community of what has been learnt. As a result of this knowledge income-generating projects may be started within the communities, creating livelihoods. For example one of the projects that pupils at the school carried out resulted in the production of an alternative to coffee using the seeds of ochre. Such an alternative to coffee is desirable in this community where real coffee is expensive and a luxury. If such could be produced at a commercial scale and priced lower than real coffee products, it would sell. This product went on display at the 2005 Bulawayo International Trade Fair and a great deal of interest has been shown on it.

The gathering and documentation of information that pupils do during the course of carrying out their Science Exhibition projects helps preserve a lot of indigenous knowledge that is currently being lost.

Enviro-Action Schools Competition projects bring problems within the community to the attention of stakeholders. Two things, among others, may result from this. Stakeholders use this knowledge to lobby for resources to resolve the issues. Stakeholders that include community representatives and other interested members pool resources and ideas to solve problems. In the example of Katonho Gulley reclamation the project resulted in the creation of jobs and livelihoods for community participants. The community in general benefits from the availability and the sale of produce from that project at reasonable prices. More members of the community learn these skills and with support, through the provision of reliable water sources (i.e. the sinking of more boreholes) similar projects may spread. Poverty limits the extent of these community developments. Boreholes are expensive and local people cannot afford to sink their own. They require donors to assist with these. Funding from donors is a limited resource. In general however there is development of a local population that increasingly has skills, knowledge and motivation to conserve the environment.

Another outcome is that once knowledge of a problem has been brought to the attention of Environment Africa, they have an Environmental Rights Unit that steps in with Community Environmental Rights Education. This may empower the community to take legal action against the perpetrators of the environmental problem. This may be an industrial company or mine located in the area.

The evolution of the school into a community resource centre that facilitates the exchange of information within the community, raising awareness and encouraging action, advocating for a better environment which uplifts the livelihoods of present and future generations, results in a contextualisation of the school into the community. The school is no longer an island within the community but an integral important part of it.

Nutrition Garden and Orchard activities taking place at Mahuwe Primary School act as a model to members of the community of the possibilities as well as the benefits of such projects. The school has a policy of training groups of community members, which in the past have included parents, and former pupils in the skills of raising orchard, nutrition gardens and plantations. These members of the community are given plots within the school in which to carry out related practical activities until such a time as they have located land and have the skills to continue on their own. This policy of community outreach has seen the sprouting of at least three Community Nutrition Gardens, some of which include raising orchards. These are very desirable to participating members of the community as well as the rest of the community. The rest of the community benefits from the availability and sale at reasonable prices, of fresh fruit and vegetables. In the past, before these Community Nutrition Gardens were established, fresh fruit and vegetables were scarce in Mahuwe town bearing in mind the semi-desert climatic conditions that prevail in the area. The survival of these Community Nutrition Gardens is made possible by donations of boreholes, and bee-hives and other inputs that community members find impossible to acquire on their own.

HIV/AIDS Awareness activities

The problem of HIV/AIDS in Mahuwe, is, as is the case in all other parts of Zimbabwe, critical. The poverty inherent in this rural society, as well as some cultural beliefs and practices, make members of the community, and especially the girl children very vulnerable to this pandemic. The impact theory of the HIV/AIDS Awareness audit zone foresees a future where its activities result in the development of reduced promiscuity in the community and in general a community that is responsible and prepared to assist HIV/AIDS victims. Although there is an apparent knowledge, attitudes, behaviour assumption in this projection of outcomes, the school complements teaching about HIV/AIDS with imparting self-reliance and survival skills to the pupils and interested members of the community.

Local Level capacity building to sustain CAMPFIRE Science Exhibition programme

The CAMPFIRE Science Exhibitions have elected Cluster and District level committees that oversee the planning and implementation of local level exhibitions. Members of these committees include the local leadership, teachers and members of the community. They are trained in administration and financial management. This results in local level capacity building.

Personal Development

Academic benefits

CAMPFIRE Science Exhibition activities result in significant developments in pupil academic abilities. The programme's impact theory (see Figure 7.1) reveals the development of statistical, graph drawing and interpretation skills (see p.262). Pupils become critical thinkers who question and evaluate what they see. They move from being observers of local problems, to being participants in problem solving (Murry, n.d). Team entries for Exhibitions also encourage group work among learners. It is worth noting that the Science and Research Audit Zone under the POEMS programme is structured to give participants regular practice in carrying out investigations, collections, designing gadgets and recipes, and making gadgets and substances.

The Enviro-Action Schools Competition takes pupils through the skills of investigations, problem identification, analysis and suggesting possible solutions, and hopefully leads pupils to a deeper understanding of the interrelated 'web of life'.

Pupils learn business principles through marketing and selling produce from the Audit Zones. Such income generating projects can help learners use scientific knowledge to support responsible decision-making and demonstrate an understanding of the interaction between the natural sciences, technology and socio-economic development.

Vocational benefits

School leavers use the knowledge they will have gained to start income generating projects.

Pupils are taught how to develop a tree nursery, grow woodlots of both indigenous and exotic trees, grow and manage orchards within the school, and how to grow vegetables in the school nutrition garden. These activities as well as knowledge gained through research for competition projects equip pupils with practical skills and knowledge that they can use to begin income-generating projects during the time they are in school, as well as after leaving school. With these skills boys and girls can be self-reliant and able to generate resources to sustain themselves. Selected teachers in the school have already received training in bee keeping and fish farming. These programmes have, however, yet to be implemented in the school.

The story is told by teachers at Mahuwe Primary School of a former pupil who started such income generating projects and was so successful that he became an enthusiast and with support, he has been carrying out outreach work in surrounding communities.

Affective impact

Pupils attitudes towards the environment change

Pupils take part in orchard, plantation and nutrition garden raising in the school. When the produce goes on sale they participate in the marketing and selling of it within their Audit Zones. They have access to purchasing these products at a reduced price. Some buy the produce and re-sell it at the market for a profit. As well as learning the economics lessons inherent in the whole process, they also begin to appreciate the value of these trees and vegetables. Teachers observe that their attitude to the tasks changes, becoming more positive. They develop an increased interest in the processes of production involved. They display conservative behaviour towards the trees and other produce within the school. In general teachers have noted a decrease in wanton destruction of trees and plants in the school, and general personal and social development as representative pupils travel to competitions, trade fairs and symposiums.

Health benefits

Pupils receive fruit and vegetables resulting in better health

The increased access of pupils to fresh fruit and vegetables improves their health. The poverty of the area and the sometimes disadvantaged home situations of the pupils means that a lot of the children come to school without eating properly. In many families during periods of severe grain shortage one meal is cooked for the whole family once a day. The problem of nutrition at the school has resulted in donations of *Mahewu*, an opaque, grain-based partially fermented drink that is made at the school and given to pupils daily at break time. This drink is highly nutritious and tasty and pupils enjoy it. Staff believe that when supplemented by fruit bought cheaply from the school in season, this greatly improves the capacity of these children to learn. Research has found a negative impact of morning fasting, or children skipping breakfast, on cognitive ability (ASFSA, 1989; Pollitt, Leibel, and Greenfield, 1991).

An increased knowledge of the dangers of HIV/AIDS and how pupils can protect themselves, supplemented by the self-reliance skills learnt at school, could save the learner's lives.

School Benefits

Collected items for CAMPFIRE Science Exhibitions used as learning aids within the school.

This is of limited use by the school. I did not get the impression that this is a major and important outcome from the projects.

School benefits financially from pupils' projects/inventions

Winning competitions puts the school 'on the map', in the district, the province and nationally. This attention brings opportunities and funding. The school borehole and solar pump was donated by the LGDA. They provided fencing for the three and half acre area in the school that is now the school garden. They also provided garden equipment. Recently a politician has given the school a donation of several

computers. Donations do take place in other schools but it appears generally true that once a school is recognised as being excellent in one area or the other this attracts development to the school.

The sale of produce from EE projects, including fruit, vegetables, gum tree poles and tree nursery, raises precious funds that are reinvested back into the projects as well as used to buy important academic requirements such as Grade 7 revision books. A classroom block was built from the proceeds of the sale of tree nursery to the Forestry Commission one particular year (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004).

School and pupils are motivated by the change that their work has brought to the community

Success motivates the school and pupils to continue working hard on their projects and win more competitions (Headteacher, Mahuwe Primary School, personal communication. September 27, 2004).

An environmental ethic created in the school

The environmental ethic created in the school results in an enriching, healthy and more sustainable environment (Makuwerere, 2004, p.11).

CASE STUDY 4: ST MARGARET'S PRIMARY SCHOOL

INTRODUCTION

St Margaret's Primary School is located in the Hwedza District of Mashonaland East Province. The school is sited on high ground adjacent a small stream. Although the area has a high agricultural potential, like many situations worldwide, even where resource endowments are high, over-utilisation has led to degradation. The school has an enrolment of over 600 pupils.



Plate 26 Myra at St Margaret's Primary School

ENVIRONMENTAL EDUCATION PROGRAMMES

The school is running one EE programme. This is the Schools and Colleges Permaculture (SCOPE) Programme (see p.223 for a description of the principles and historical development of Permaculture in Zimbabwe). The school also participates in the Tree Growing and Tree Care (TGTC) Competition. However their entry for this is based on their permaculture efforts. The school no longer takes top prizes as

winning criteria for this competition are incongruent with permaculture principles and practices (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004).

CONTEXTUAL IMPERATIVES FOR ACTION

The Problem Base in Zimbabwe has been outlined on p.238. Below is an outline of local issues that drive the implementation of EE programmes.

The Problem base at St Margaret's Chigodora Primary School

The school entered and won a TGTC competition ran by The Forestry Commission. Staff from the school were exposed to information regarding the programme at a related event. The staff showed great enthusiasm to be a part of this project, primarily because of the problems the school was facing. It was very hot during the hot months and strong winds blew, carrying away the soil. Consequently the school grounds were bare and the school environment was hot and dusty. Most years during the rainy seasons storms would blow the roof off some classroom blocks. Furniture and books would be destroyed. Run-off storm water would flow through the school play fields and around the school buildings, and as the school is located on a slope, the water would flow down the main access way and into the river that crosses the bottom of the slope. The topsoil would be washed into the river and after the storm there would be a gulley where the access way was. Visitors and people with cars could not come into the school when this happened. The school also suffered from pollution due to poor waste management (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004). The majority of pupils in the school come from very poor homes and consequently often come to school hungry or literally starving. There were also inadequate teaching and learning resources. The poverty in the community meant that often parents and guardians could not both buy fertilizer and other farming supplements and pay school fees as well. Sixty percent of the pupil population live without their parents who are either deceased or working in the city. In many cases the deaths and sickness are due to the HIV/AIDS pandemic that is ravaging the country. Children in this case are in the care of a guardian who may be one or more grandparents or other relative (TIC for

Permaculture at St Margaret's Primary School, personal communication, September 22, 2004).

Values

A value that guides the school's community outreach programme is that schools should be satellites of different forms of knowledge (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004).

SOURCES OF INFORMATION

For the purposes of this research I held a brief introductory discussion with the headteacher who introduced the EE programmes running in the school and then quickly referred the rest of my inquiry to the TIC of Permaculture in the school and his deputy. I interviewed the two separately and together as the story of the SCOPE programme at St Margaret's unfolded. We watched a video of one of the Permaculture Open Days at the school. The TIC and his deputy took me on a guided tour of the house of the deputy TIC for Permaculture where a pilot rural homestead permaculture programme was running. Having submitted my document request form I was given free access to a large file that contained all documents relating to the SCOPE programme at the school. I observed a language lesson (see Plate 27 and Plate 28), a Mathematics lesson (see Plate 29), and a science lesson, all of which used some aspect of Permaculture as part of the teaching. I interviewed the responsible teacher after each lesson observation. Programme documents were used to verify and complement information obtained from interviews and observation. The list of documents used for this purpose may be found in Appendix IV.

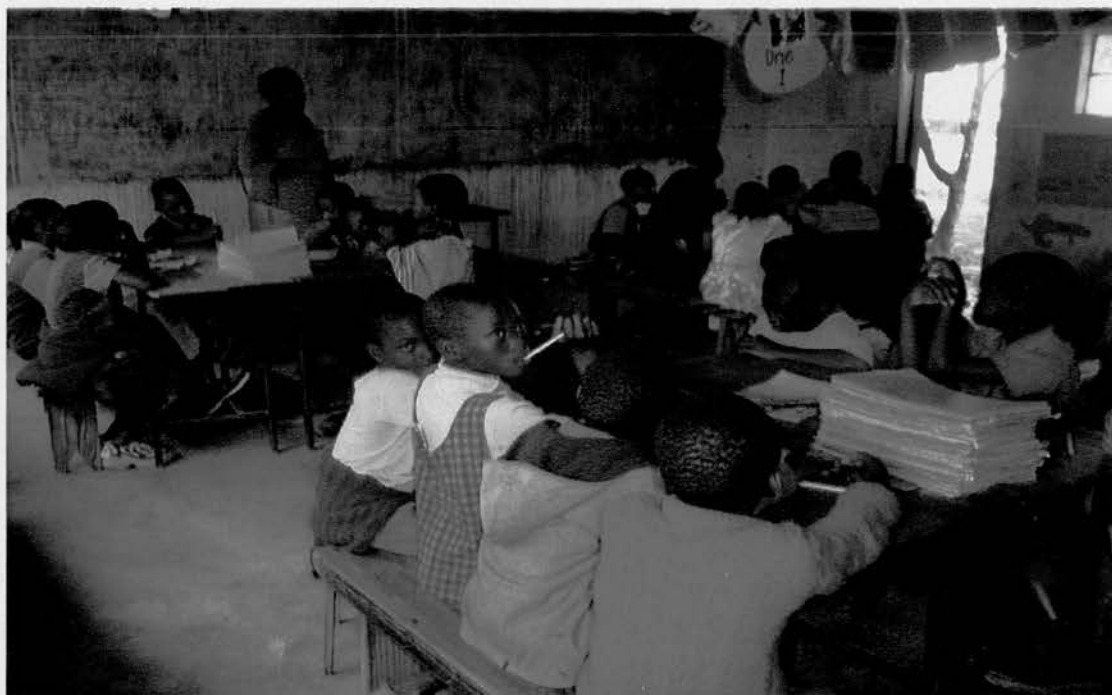


Plate 27 A Grade 5 teacher introduces the topic ‘Composting’ inside the classroom.



Plate 28 Pupils carry out a practical of the concepts learnt outside the classroom.

Permaculture principles and practice are used as a teaching and learning aid.



Plate 29 Pupils use the school Nursery for Mathematics learning exercises.

Information obtained from the documents, interviews and observations was analysed to describe important predetermined aspects of individual EE programmes that constitute a linear logic model. These aspects are described in Chapter 3. The linear logic model, drawn for the SCOPE programmes at St Margaret's Primary School and its resources and prior functions, may be found in Appendix VI. In keeping with Figure 3.1 it is possible to distinguish from the linear logic model process theory and impact theory. The organisational plan for the programme (a part of process theory) is outlined below followed by diagrammes of the programme's impact theory.

SCOPE programme organisational plan

This is made up of the programme's aims, services it provides and its resources and prior functions. The first two are presented here. The programme's resources and prior functions are presented in Appendix VI.

Programme Aims

- To create a nation able to produce enough food to feed itself (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004)
- To promote sustainable land use/environmental management (Nyika, 2001b)
- To equip schools and communities with practical environmental education and solutions (Bote, 2002)
- To produce pupils with sound environmental education and survival skills (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004)
- To integrate Permaculture principles into relevant curricula (Nyika, 1998).

The services that the SCOPE Programme will provide

Phase One of the SCOPE Programme was launched in 1994. As part of the activities of this phase seminars and workshops were held for Regional Directors, Deputy Regional Directors, selected Education Officers and District Education Officers, Heads and selected Teachers from the participating schools (Nyika, n.d, unpublished, programme document). The ILUD process is the main frame of reference for all training workshops that are run by the SCOPE Programme. The stages of the ILUD process are:

Situational analysis – developing a common understanding among participants of the existing situation using observation techniques.

Holistic goal formation – developing a broad picture of what the school community would like to achieve, in respect of improvements that they would like to have on their land.

Integrated design – the use of Permaculture principles to produce a land-use plan.

Plans of action and monitoring – drawing up schemes of work and deciding on ways of checking progress (SCOPE Programme, 1996; Sustainable Agriculture Extension Manual, author unknown, n.d).

The main training is given to two teachers from each participating school during two-week in-service workshops in Permaculture and ILUD. Implementation workshops are run at each participating school for representatives of parents, staff and pupils (Nyika, 2001b). This training is aimed at giving the participants the following skills:

- Planning for sustainable land use management
- Producing integrated designs for a given area
- Organic production
- Environmental management (including soil and water conservation)
- Monitoring progress

The participants are expected to apply these skills in their immediate local environment after having participated in setting up demonstrations of the techniques during the workshops that are held at the schools. The application of the skills by pupils and parents are done under the supervision of teachers who would have received the two-week in-service training in ILUD (Nyika, 2001b).

Classes taking part in the programme are Grades 3-7. For two hours a week, as part of the Environmental Science time allocation, pupils from these classes are taught Permaculture by trained Permaculture teachers (Chari, Dembezeko, Makwinja and Maminimini, 1995). The school has been divided into five *Zones*. *Zones* are sections of the school being used for distinct purposes and the division into zones is made using the criteria of the energy demands of activities in these areas, i.e., how much care and attention is needed in each zone and how regularly visits are needed regarding activities happening there.

A teacher who has received basic permaculture training supervises each zone. This Zone Leader works with other teachers and pupils allocated to that zone. Teachers divided themselves into the five zones on the basis of their personal interest. Children were distributed according to grades, and are expected to change zones termly so that they could gain all round knowledge and skills in permaculture practices. Teachers are encouraged to give the children background theory when

explaining and directing activities. They are also encouraged to discuss and work together with the children from the planning stage within their zones (Muyambi, n.d a). According to Muyambi (n.d b) Permaculture zone management demands each zone team to:

1. Evaluate resources available
2. Examine constraints
3. Set Aims and Objectives

The team sets realistic aims and objectives taking into consideration the following: initial resource and management skills, personal aims and objectives of officers, and the possibility of carrying a sideline business

4. Once the aims and objectives have been discussed, agreed upon within the team and set, they are written down and frequently referred to as a reminder to stimulate officers and help them stay on course.
5. Select the best combination of enterprise
6. Select the best combination of crops that are compatible with the school's climate, altitude and soil type
7. Plan
8. Implement
9. Evaluate the results:

At the end of a set period officers evaluate their performance against their set goals/objectives.

Officers are expected to keep a sound record of activities they are undertaking. Permaculture is thus practical environmental education, and pupils have to do the practicals, solving real environmental problems (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004).

The following are the activities taking place in the different Zones at St Margaret's Primary School.

Zone 0

This is the Headteacher's office. That is where planning for the programme is done. Staff decide what to do regarding the programme in this office (TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004).

Zone 1A and 1B

Zone 1A consists of flowerbeds and school access ways. Zone 1B is the area behind the office where there is a small school garden. These two zones have different zone leaders.

The staff and pupils periodically put cut tall grass from nearby fields surrounding the school grounds and lay this on the pathways and main access routes into the school. This functions to spread and sink rain water, reducing run-off. This raises the water table beneath the school (Nyapokoto, 2000). As well as controlling dust the grass is also later used in the garden to make compost. This grass decomposes much easier in compost because stamping feet on the pathways would have broken it down, and there is a greater surface area on which microorganisms can work. The grass is also used for mulching. It is ideal as not only will it have been broken down, but also will have had pests and their eggs killed by trampling feet. It can thus be introduced to the garden pest free (St Margaret's Primary School, TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)

Zone 2

The main school garden is in this Zone. It contains also the school Nursery. The school Nursery is the heart of all the school's activities concerning plant production all year round. Exotic and indigenous fruit and shade tree seedlings are grown here. Vegetables like tomatoes and onions also start their life here. Herbs are also nursed. These are then intercropped with the vegetables for pest repelling and ornamental uses. The nursery produced here supplies all the other Zones. The herbs grown here are also greatly valued for their healing properties. This is an important part of permaculture practice, whose immediate usefulness to the school and surrounding communities is a great selling point for permaculture. The schoolteachers generously

teach pupils the names and uses of the various herbs and give them seedlings to grow at home if they so desire. They also give appropriate herbs to pupils and members of the community who approach them with various complaints. As a consequence the school has become the first point of call for ailing members of the community, not the clinic, as was the case previously. Part of the reason for this is that, unlike at the clinic, the herbal treatment provided by the schoolteachers is free. It is also more sustainable as members of the community can plant these at the homesteads and be self-sufficient in the future. As of April, 2005 the clinic has been referring some patients to the school. This is in cases where the clinic runs short of drugs, or if the patient has for a long time been visiting the clinic with no improvement (HIV/AIDS sufferers receive certain natural immune system boosters which grow well in the school, but are not easily available in the local area outside the school. Although these natural immune system boosters may be bought in surrounding cities, they are very expensive, ordinarily putting them beyond the reach of locals) (TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004; Mubonderi and Makuyana, n.d).

Zone 3

The Third Zone is the school orchard. Here mangoes, oranges, lemons, tree tomatoes, raspberries and paw-paw grow. The fruit trees are integrated with vegetables for maximum utilisation of space. Further as pupils and staff are watering the vegetables they will also be watering the fruit trees. Most of these fruit trees are harvested throughout the year and are a source of income within the project (Tirivavi, Sakuvunga and Mandaza, n.d; TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004).

Zone 4

This is an area above the stream that runs at the foot of the hill where the school is built. This area is attended to seasonally. A maize crop is grown there during the rainy season. The area has an orchard of mangoes and guavas, a gum plantation and pigeon pea. During the rainy season the maize is planted in the same area as the pigeon pea plants, and the two are good companion crops (TIC Permaculture, St

Margaret's Primary School, personal communication, September 21-23, 2004; Minutes of programme meeting, 1994).

Other activities

The school also does goat rearing, bee keeping and is developing a fishery. The goats are kept specifically for the benefit of the orphans in the same way as the school's Nutrition Garden. The goats provide milk that is distributed to the orphans associated with the Nutrition Garden (TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004).

The school Nutrition Garden was created for the orphans within the school. The orphans were identified by a questionnaire. First priority was given to children who lived in families headed by children. Second priority was given to children looked after by a grandmother only, third priority those that are looked after by both grandparents. Pupils are allocated plots in the Nutrition Garden according to their availability. Guardians, siblings and members of the community are encouraged to come and see these children's activities and can assist them as much as they wish. The children practice the polycropping techniques recommended by permaculture. Children intercrop vegetables, flowers, fruit trees and herbs. These children are free to harvest and take home the products of their gardening. Any excess that the children have they are free to sell and to use the money to buy other things they may need. In cases of exceptional need children have been allowed to continue working their beds in the Nutrition Garden within the school even after they have gone on to the neighbouring secondary school. The school considers the Nutrition Garden as belonging to the community. The garden is only situated in school grounds for monitoring purposes, but in principle it belongs to the community (TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004).

At the beginning of the programme the head-master and teachers wrote and sent out application letters to donor organisations seeking funding for the programme's activities. At present the programme is self-sustaining on funds earned from selling

young trees, vegetables, maize, gum poles and herbs. For the pilot phase of the Permaculture Programme at St Margaret's Primary school funding was received from Dairy Marketing Board, Agrifoods, Farm and City Centre, National Farming Network and The Kellogg Foundation. The teachers and head master were actively involved in selecting the 10,000l tank that was donated to the school by the Dairy Marketing Board and Agrifoods, two partially government owned companies. The company agreed to transport the tank to the school. The teachers and head then approached the Natural Farming Network for financial aid to purchase relevant water pipes. The organisation agreed. After collecting the cheque the head was assisted by a teacher to buy the piping material. The local Council donated 45 x 6m galvanised pipes and offered technical advice. A teacher and the head designed the whole piping system for the school. Parents were called to view the tanks and the pipes and were further asked to dig trenches. They accepted the challenge. Parents worked willingly and quickly. Parents were very supportive and spoke very positively about the project (Muyambi, n.d a).

Every two years the school holds a Permaculture Open Day (see Plate 30). This was the 'brainchild' of the then head master and was first held in 1995 (Muyambi, n.d a). The main intention in the first instance was to thank the donor community. Parents, teachers, pupils, the local leadership, and members of the donor community, interested visitors, and relevant Ministry officials grace such occasions. The occasion is an opportunity to showcase permaculture, spread its message and increase the programme's support base (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004).



Plate 30 Permaculture Open Day at St Margaret's Primary School.

(Source: School archives).

When they find time from their duties teachers (and pupils) go and assist in the design of homesteads according to permaculture principles in the community. Teachers and pupils go to assist other schools develop into Permaculture schools (Chari et al., 1995). St Margaret's Primary School supplies other schools with plant seeds and seedlings for their permaculture practices (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004).

The school actively grows and nurtures indigenous and exotic trees, fruit trees as well as grass wherever possible as ground cover. A variety of plants are flourishing in each of the zones. These include fruit trees, pumpkins, legumes, flowers, herbs and other plants that act as pest repellents. Herbs grown within the school are fully exploited for their aesthetic, insect repelling and healing properties. These are taught to the pupils as part of the programme, who in turn transfer the knowledge to their homesteads.

During periods when the school harvests enough fruit pupils are fed these twice a week (Nyika, 2001c). Pupils are also fed food from the school's harvest on sports days and other such occasions. Excess fruit, grain, seedlings and herbs are sold by the school to the surrounding community and beyond. This raises funds for the school which are used to support school administration, orphans and further

programme activities (TIC and Depute TIC for Permaculture at St Margaret's Primary School, personal communication, September 21-23, 2004).

Sometimes when the school does not have prizes to give the children on prize giving day, or at the end of the term, then a basket full of assorted fruit may be given as a reward for good work (Depute TIC for Permaculture at St Margaret's Primary School, personal communication, September 21, 2004).

The school regularly takes part in Environmental Education Competitions, run either by SCOPE, or SCOPE in conjunction with other organisations (School Permaculture programme documents).

One teacher at the school is piloting permaculture at his homestead as an example of an out of school application of the programme (see Plate 31, Plate 32 and 31). This is for the purpose of proving to parents and other members of the community that it is possible to actually do these activities and to live in this manner in an out-of-school environment, without school children and without donor support.



Plate 31 At the Deputy TIC of Permaculture's pilot permaculture homestead.



Plate 32 At the Deputy TIC of Permaculture's pilot permaculture homestead.
(Note the 'Chicken tractor' in the background).



Plate 33 The Deputy TIC of Permaculture at his homestead.

The figures that follow (Figure 7.4 and Figure 7.5) show the Impact Theory for activities that are taking place in different zones at St Margaret's Primary School. Only Impact Theories for the school Nutrition Garden and the school Nursery are shown within this main body of the thesis. Diagrammes showing Impact Theories for other activities taking place under the Permaculture programme at St Margaret's may be found in Appendix VI (Figure A.1 and Figure A.2). As explained in p.107 the temporal sequencing of components in the impact theory is used in the present study as an analytical tool highlighting important issues regarding the real and projected impact of the individual EE programmes. All impact theories drawn for EE programmes at St Margaret's are the basis of the analysis of the summative impact of the school's Permaculture programme presented on p.293.

Figure 7.4 St Margaret's Primary School Permaculture Nutrition Garden Activities – Impact Theory.

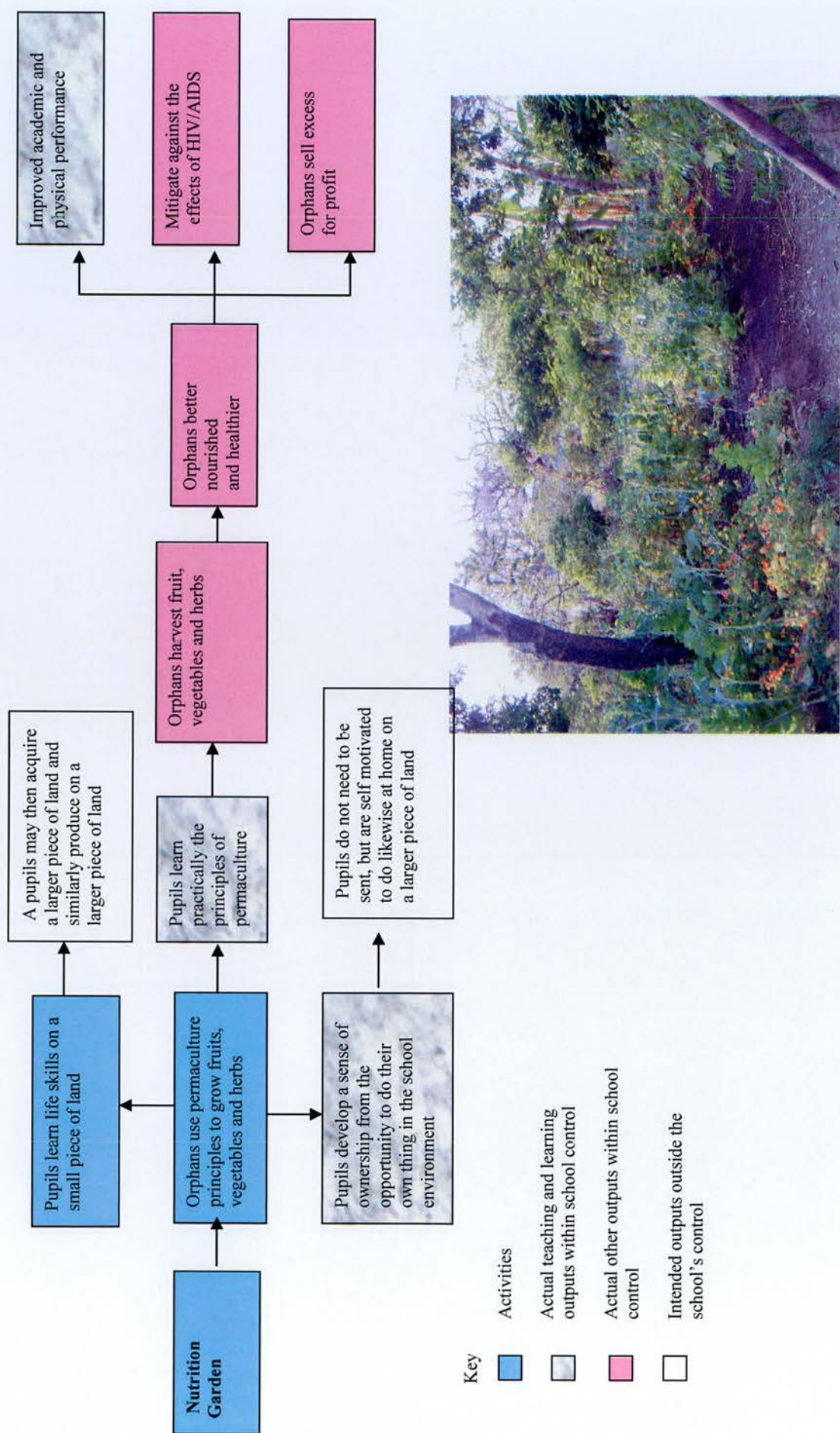



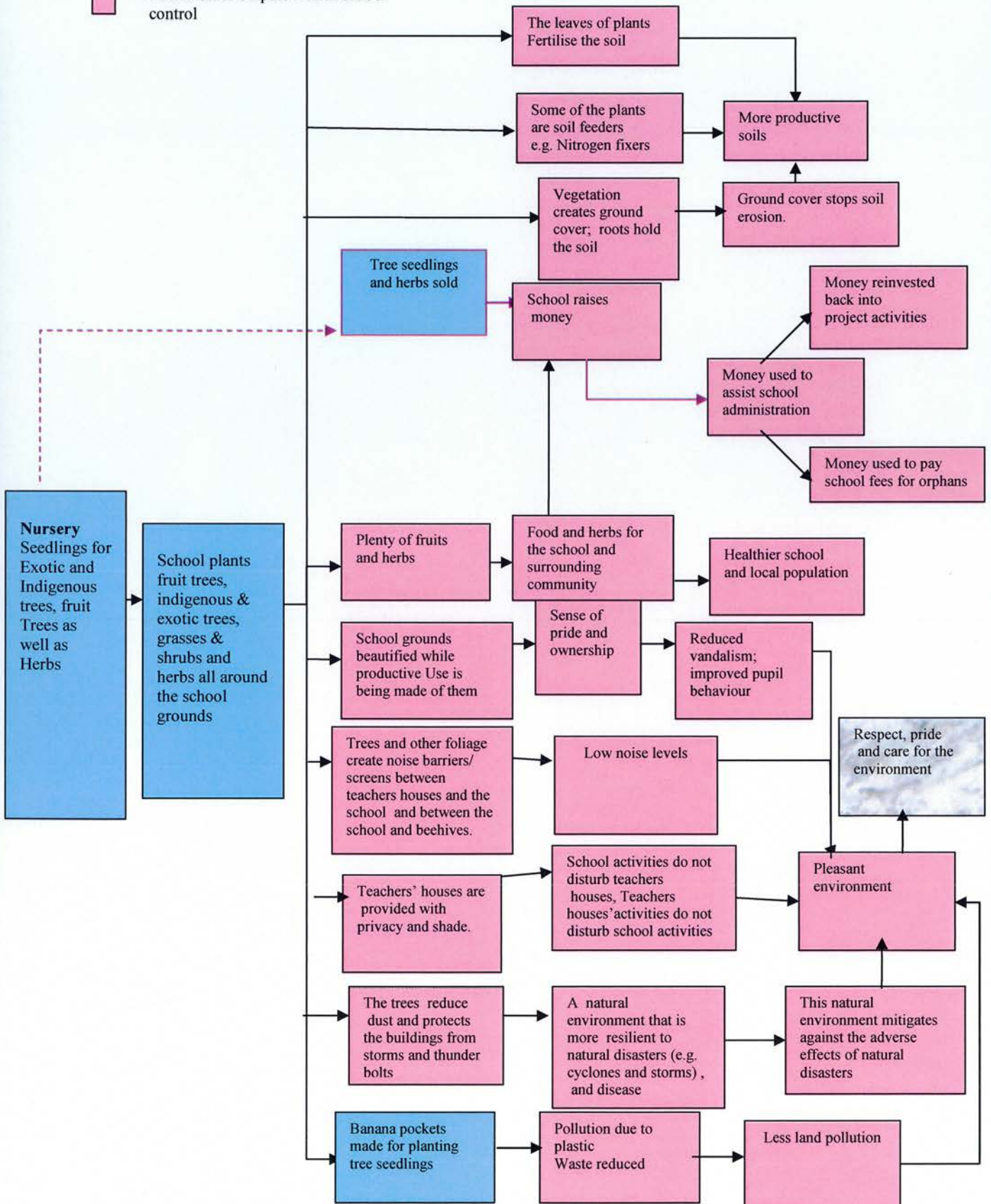


Figure 7.5 St Margaret's Primary School Plant Nursery Activities –

Key

Impact Theory

-  Activities
-  Actual teaching and learning outputs within school control
-  Actual other outputs within school control



Environmental citizenship benefits

Using Hungerford and Volk's (1990, p. 9) definition of environmentally responsible citizens⁹ the following is an analysis of the extent to which the activities taking place at St Margaret's Primary School attempt to 'cultivate' good environmental citizens both in the school and in the community. The analysis includes reference to the classification in Hungerford and Volk (1990) definition by the insertion of (1) to (5) against each activity. The characteristics included in this analysis of the development of environmental citizenship behaviour include those for which empirical evidence exists as well as others that reflect the intentions underpinning certain activities as illustrated in the relevant sections of the impact theory diagrams.

An awareness and sensitivity to the total environment

The permaculture value of 'living in harmony with nature' reflects the belief that from a human utilitarian perspective all life has its use in the environment, even organisms that conventionally would be regarded as pests. Hence the planting of snake repelling plants around the school and teachers' houses, the use of polycropping including pest repelling plants, and the use of plant-based solution sprays to repel pests rather than killing them, are all a living demonstration of the school's commitment to this ethic. Teachers emphasise to the children that it is possible to do this by respecting the needs of other living organisms. For example, pupils are told not to attack snakes when they see them, not to make a lot of noise near bee hives (or the bees will swarm and sting), and provide bees with water, (or they will swarm and sting). Research by Alexander, North, and Hendren (1995)

⁹ Hungerford and Volk (1990) define an environmentally responsible citizen as one who has (1) an awareness and sensitivity to the total environment and its allied problems [and/or issues], (2) a basic understanding of the environment and its allied problems [and/or issues], (3) feelings of concern for the environment and motivation for actively participating in environmental improvement and protection, (4) skills for identifying and solving environmental problems [and/or issues], and (5) active involvement at all levels in working toward resolution of environmental problems [and/or issues].

showed that school gardening helped to foster a greater respect for living things. They denote this as environmental sensitivity, indicating one's empathetic view with the environment. It encompasses the view that one must live in ecological harmony with the environment. This has been empirically established to be a predictor of environmentally responsible behaviour (Ramsey & Hungerford, 1989).

A basic understanding of the environment and its allied problems

The involvement of pupils in planning, implementation, and evaluation of the results of activities taking place in the different Zones within the school results in remarkable opportunities for learning, bearing in mind that teachers are encouraged to give the children background theory when explaining and directing these activities. Consequently Permaculture at the school is practical EE, and pupils do practical work that is geared at solving, real environmental problems within the school, that they will have been party to identifying. Pupils thus develop an understanding of their environment and related issues and problems.

Feelings of concern for the environment and motivation for actively participating in environmental improvement and protection,

The Permaculture programme at St Margaret's Primary School uses inculcation to instil in learners environmental practices and values desired by programme managers and teachers. Methods used include moralising, modelling, and a system of positive reinforcement. Moralising consists of telling the learners what is right and what is wrong (Bandura, 1986). Since heterogeneous learners follow the lead of respected moral authorities, modelling potentially has profound effects on learner behaviour. At St Margaret's the whole school is a model for learners and the community of desired practices and values the Permaculture programme is trying to inculcate. One of the teachers is modelling in his homestead the principles of permaculture, presenting a living role-model of the application of the desired practices and values in a real community homestead. According to social learning theory, learning occurs through observation of others (the modelling of the behaviours of others), through direct experiences, and through direct teaching (Bandura, 1986). This is consistent with research into the ways in which attitudes are formed in adults (e.g., Oskamp, 1991). According to Musser and Diamond (1999) therefore, the pro-social, pro-

environmental attitudes of children should be influenced by observation, experiences, and teaching, both at home and at school.

That 'permaculture is its own reward' is in a sense self-evident as pupils experience less the impact of adverse weather conditions, enjoy the fruits from the orchard, vegetables from the garden, receive treatment for their ailments and see orphans being provided for. This reward system acts as positive reinforcement for the uptake and practice of permaculture principles and values. Below are some supporting statements:

"children here like carrots, peas, because they are unfamiliar vegetables and very interesting to them. They like them. So we give them the seed, they plant around the new tree in the water basin that is there. As they water those vegetables they are watering our tree indirectly..... everyday he takes some water for the carrots and peas and he knows when they are ripe he harvests them, they belong to him. So he gives that tree more attention"

(TIC of Permaculture, St Margaret's Primary School, personal communication, September 29, 2004)

"So we try to create an environment that is wanted or loved by the pupils so that when they go home they try to keep their environment like what they see at school."

(Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21, 2004)

Vaske and Kobrin (2001) examined environmental psychology's notion of place attachment (see also Proshansky, Fabian & Kaminoff, 1983) describing the meaning places have for people in terms of two place attachment indicators – place dependence and place identity. Place dependence reflects the importance of a resource in providing amenities necessary for desired activities (Stokols & Shumaker, 1981; Williams & Roggenbuck, 1989). It suggests an on-going relationship with a particular setting. Taking the nutrition garden as a case in point for children's involvement in the rest of the programme as a whole: the Nutrition Garden represents to orphans a source of food, fruit and herbs. This is a resource that the school has identified that these children would not otherwise have access to. It meets a real need in the children's lives. According to Moore and Graefe (1994) a history of repeat visits due to place dependence may lead to place identity. This emotional attachment reflects the symbolic importance of the place (Williams & Patterson, 1999) and may lead to a sense of belonging/purpose (Relph, 1976; Tuan, 1980). As such, place identity has been described as a component of self-identity

(Proshansky et al., 1983) that enhances self-esteem (Korpela, 1995) and increases feelings of belonging to one's community (Relph, 1976; Tuan, 1980). Place identity may result in specific environmentally responsible behaviour, while increased feelings of belonging to one's community are a predictor of general environmentally responsible behaviour.

Skills for identifying and solving environmental problems [and/or issues] and active involvement at all levels in working toward resolution of environmental problems [and/or issues].

As well as being involved in the planning, implementation, and evaluation of the results of activities taking place in the different Zones within the school some pupils accompany teachers when they are invited out to assist parents and other members of the community establish permaculture homesteads. Pupils take an active role in marketing the virtues of permaculture to parents and other stakeholders on permaculture and school open days. They do this by leading tours around the school site, reciting with great enthusiasm and knowledge the names and uses of the various plants in the school, and why they are located in those particular areas in the school. They do plays, sing songs and read poetry, all based on permaculture (School video of Mahuwe Primary School's Permaculture Open Day, 2002).

Social and Community Development

St Margaret's Primary School is a showcase of successful permaculture in schools. Its continuing success has made it an example from which the SCOPE Programme, other schools and practitioners who are new to permaculture can learn about the programme (Nyika, 2001b). As the school models permaculture, and undertakes community outreach programmes such as Permaculture Open Days, Permaculture Workshops, training sessions at other schools as well as at Universities and Colleges, permaculture cascades into the community, and the nation as a whole (Special feature: the success story of St Margaret's Primary School in permaculture: author unknown, n.d).

The Deputy Teacher-In-Charge (TIC) of Permaculture at St Margaret's who is piloting a permaculture homestead at his home (located about 4km from the school) has a relatively young (five years old) traditional rural homestead. A visit there revealed a lush green environment with plenty of fruits, vegetables and grain. This is very unusual given the fact that this homestead is situated on quite high ground, in an otherwise very dry area. Permaculture water harvesting techniques were obviously working wonders there. This teacher is the only 'breadwinner' in his family. He and his wife have two children and live with an additional nine from the extended family for whom they are solely responsible. All inhabitants of this rural household that I saw were positively 'glowing' with good health represent an excellent model to the community of the advantages of adopting permaculture practices.

The relevance of permaculture to the everyday needs of this rural community is a motivating factor for its uptake. Upon request trained teachers from St Margaret's go to other schools and hold Permaculture Workshops which are a springboard for these schools to begin permaculture activities (TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004). This route to becoming a 'Permaculture School' is different from the one St Margaret's used because the SCOPE Programme has reached capacity in as far as the number of schools it can work with directly (Nyika, 2001b). However the SCOPE vision for permaculture to spread to all schools in the nation remains and schools that wish to become a 'Permaculture School' invite trained teachers to come and train its own teachers. SCOPE will give these training teachers as much support as it can though the requesting school has to meet training and subsistence costs.

Looking at St Margaret's Primary School's interaction with its pupils, the community, surrounding schools, and even further afield, with national universities and colleges, it is clear that the school uses modelling, moralising and direct teaching to spread permaculture practices and values. The school has been host to visitors from abroad and all parts of the country. These have been students, researchers and practitioners in the field, Ministry officials, donors and so on (Special feature: the

success story of St Margaret's Primary School in Permaculture, author unknown, n.d).

The programme logic assumes that the community will come to see the school as a resource, and that the community will use this resource. The reality from teacher interviews and from my own observation, is that to a great extent this is true.

Generally the school prides itself on harvesting fruit throughout the year. During the times of the year when there is a lot of ripe fruit, such as the mango season, the school has so much excess fruit that this is sold 'by the truck-load' to members of the local community and further who may want it. Members of the community come to the school with ailments, and a teacher goes into the school garden and returns with a bunch of herbs and prescribes a preparation of these herbs to heal the ailment. Pupils too are treated likewise with herbs they can take home. Pupils also come in and relate to the teachers ailments that may be plaguing their relatives at home. In this case teachers may give herbs to the pupils to take home for their relative.

There is a great deal of pride in the school within the community as evidenced by interviews in the publication *Special Feature: the success story of St Margaret's Primary School in Permaculture* (author unknown, n.d) and an interview with the local Headman, Chief Chigodora, who has also been the chairman of the school development committee for the past 30 years. The Chief spoke fervently about the need for easy access to more water in the school. That way even more could be done with permaculture. When asked if doing more on the programme would overly burden children with manual labour, he emphatically denied this possibility. He believes that increasing the activities of the school on permaculture is desirable and well within the capabilities of the pupils. This link between school leadership and local leadership supports the programme logic vision that the school (and eventually local schools in general) will become a focal point for the promotion of sustainable land-use as well as satellites of different forms of knowledge. From here this knowledge is expected to spread rapidly throughout the communities. The project, including the orphans' Nutrition Garden has become a shared space, and a place of overlap between the community and the school (Evergreen, 2000). The success of

the project involves parents, teachers, community member volunteers, and officials from local government as well as central government.

Several research studies in the UK and the USA looking at the value of school gardens and farms have demonstrated links between the community and the school . For example Poulsen (1992) found that a school farm brought the community together through a more active involvement of the students' parents. The school garden constructed at a primary school in Westminster (London) became a community resource (Canaris, 1995). The aim of the school garden, located in Vermont (Canada), reported by Canaris (1995), evolved from a focus on developing nutritional awareness toward much deeper and more meaningful learning experiences. The 'food forest' developed at St Margaret's focused from the beginning on sustainable food production for the very practical purpose of providing food for the school community. Whereas in the Vermont case parents and students began the construction of the school garden with parents and older adult volunteers joining in and continuing to maintain the garden, at St Margaret's teachers and pupils began the construction of the garden. Parents and other adult volunteers stepped in only on invitation to help with heavy structural improvements such as digging trenches for water pipes. The pupils, supervised by teachers, are solely responsible for maintaining the food forest. Adult volunteers and guardians, however, have an open invitation to come in whenever they can to assist the orphans in working and maintaining their Nutrition Garden. The Nutrition Garden is considered to belong to the community.

The impact theory for the use of polycropping in the school (p.490) and the community illustrates how the process is aimed at the production of a more 'valuable' harvest, both nutritionally and financially for the school community and families in the community. In both these communities there is a significant percentage of young children, the sick, and the old, all of whom are required by the social and economic situation they live in, to take an active role in food production. The minimum labour, minimum input methods that permaculture methods encourage and teach are ideal for this population, and this is evidenced by the enthusiasm with

which permaculture has been received both in the school and the community (Nyika, 2001c; TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-24, 2004).

Personal Development

Cognitive/Academic benefits

The Permaculture programme at St Margaret's assumes that by using the natural environment which has been created in the school as a learning resource to teach the various subjects in their curriculum, the school is able to teach pupils concepts from the concrete to the abstract in a manner that allows recall of these concepts, with the environment as a constant reminder. Their outdoor environment thus provides a sustainable alternative to textbooks and other visual aids that are severely short in this rural school.

St Margaret's Permaculture programme involves learners a great deal in the principles and practice of land husbandry and food production. The school considers permaculture as a subject that cuts across all the subjects taught in the primary school curriculum. Also, quite conveniently, the permaculture programme within the school grounds models most of the concepts treated under the nine topics in the primary school Environmental Science Syllabus. According to the TIC for Permaculture, it can be used in the teaching of all nine Environmental Science topics such as soil, grass and grazing, crops, plants and animals, water, trees and forestry. In Religious Education the project is used in illustrating concepts such as the Garden of Eden. In Mathematics plants within the school are used to teach topics such as percentages, estimates and predictions. In English and local languages the permaculture food forest in the school is a rich source for poetry, drama, role-play, comprehension exercises and letter writing.

Affective impacts

The value theory of Rokeach (1976) that has been supported by empirical research, has shown that there is a complex hierarchical relationship among beliefs, attitudes, values, and behaviour. Knowledge is only one of the crucial components of environmental attitudes and behaviour. Dispoto (1977) found that the environmental

activity of up to 40% of people studied could be explained by how much they knew. Ramsey (1976) reported a causal relationship between increased environmental knowledge and a moderation of environmental attitudes. His study indicated that two crucial factors in the attitude change process are the necessity for a long-term effort in changing attitudes and values and the type of education and attitude involvement employed. According to Caduto (1983) increased knowledge alone is not enough to be most effective in affecting values and behaviour. Instead of facts the teacher should concentrate on altering basic value-attitudes associated with conservation. In fact research has shown that there is little correlation between cognitive achievement and concern and values (Stapp, 1970 in Caduto, 1983). There are studies (Borden and Schettino, 1979; Horsley, 1977) that have confirmed that changes in environmental attitudes and behaviour are most effectively brought about by Environmental Values Education (EVE) strategies that increase all aspects of the learner's level of knowledge, amount of emotional involvement, and experience in the area being addressed. The analysis of the permaculture programme as outlined in the present study reveals that the programme meets the three criteria of EVE. For example:

Level of knowledge

All the children in the school from Grade 3 to Grade 7 belong to a Zone where they go to work for that particular year. The other year they will change zone, so that they also get knowledge of what is actually happening in the other zones. And as I have said earlier on, we conduct workshops.

(TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004)

Emotional involvement

"So we try to create an environment that is wanted or loved by the pupils so that when they go home they try to keep their environment like what they see at school."

(Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21, 2004)

Experience in the area being addressed

"It's not the teachers who do the work. The teachers will just give the pupils the knowledge of how to do it, and then the pupils will do it for themselves."

(Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21, 2004)

Behavioural impact of a pleasant school environment

According to staff reports, since the school grounds have been improved pupils' behaviour has generally improved. Where initially pupils used to pull out young tree seedlings and play ball in the school 'quad' (and breaking windows), this no longer happens. Pupils now respect the school grounds, take pride in them and cherish the plants that they have planted there. This respect and care of the school grounds is further evidenced by high attendance from classes selected for the holiday duty of maintaining the school garden and orchards. This is evidence not only of the pupils' own enjoyment of working in the school garden and orchard, but is also an indicator of parental commitment. Evergreen (2000) found that using school grounds that are designed to maximise learning can lead to a reduction in anti-social behaviour and an increased pride in the school. Skamp and Bergmann (2001) demonstrated more specific behavioural effects on students as calming effects, reduced vandalism and littering and a deeper staff-student relationship.

Investigating the *Learnsapes* project, Skamp and Bergmann (2001) found that improved school grounds resulted in a change in the students' attitude towards the school and its grounds. Students felt a renewed pride in and ownership of the school grounds. These reports support St Margaret's Primary School's logic model that postulates that the new improved grounds and their involvement in bringing this about, results in a sense of pride and ownership in the learners.

Vocational benefits

Pupils taught how to establish and manage a tree nursery, and an orchard within the school, grow vegetables in the school nutrition garden as well as some livestock are equipped with practical skills and knowledge they can use to begin income-generating projects during the time they are in school, as well as after leaving school. With these skills boys and girls can be self-reliant and able to generate resources to sustain themselves.

Health Benefits

The health of the pupils involved is improved (in the case of orphans) because of increased intake of fresh fruit and vegetables. Staff believe that because of this improved nutritional status St Margaret's Primary pupils perform well in sporting competitions against pupils from other schools where permaculture is not practiced (TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004). The health status of HIV/AIDS and other orphans is much improved and the Nutrition Garden facility allows them to attend school and not miss school to attend to their family gardens at home. This would be a real possibility as the school day overlaps with the time gardens are tended at the homesteads.

School Benefits

Pupils walk across the grounds of other schools from their homesteads to come and attend St Margaret's Primary School. Teachers prefer to teach at St Margaret's compared to all other surrounding schools. As a result St Margaret's is the largest school in the area (TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004). The food forest that Permaculture has created in the school makes the school attractive to pupils and teachers. No doubt there is the aesthetic attraction, as well as the promise of inherent nutritional benefits. The school also has electricity, and has tapped water. Both of which are unusual for the schools in this rural area. Both of these developments came about as a result of its success in school grounds development. This success attracts visitors from all over the nation and indeed the world. It is as a result of these visits that the school receives donations that lead to developments in the school (Special feature: the success story of St Margaret's Primary School in Permaculture- author unknown, n.d). St Margaret's Primary thus attracts and retains qualified teachers; a worthy achievement in this remote rural area.

School ground developments in the school also result in protection from the elements, and create a cool, shaded, quiet environment that is enjoyed by both teachers and pupils (Nyika, 2001c).

8 CONTRASTING THE IMPACTS OF ENVIRONMENTAL EDUCATION PROGRAMMES IN ZIMBABWE AND SCOTLAND

This chapter is a cross-case description and analysis of the research findings. According to Patton (2002), this involves describing the causal linkages suggested by and believed in by those you have interviewed, (Patton, 2002, p. 478) The chapter also contains some interpretation of the findings.

THE IMPERATIVES FOR ACTION

The revised Scottish 5-14 Environmental Studies curriculum guidelines place a very strong emphasis on stewardship for the environment through the development of informed attitudes. Stemming from this Argyll and Bute Council and its schools, which include Inveraray Primary School, places a strong emphasis on developing informed attitudes to the environment and equipping pupils with the knowledge and skills to care for our world. Further, Education for Sustainable Development is seen as cross-curricular, permeating all aspects of learning.

In both Inveraray Primary and Currie High policy implementation in the area has taken the form of school grounds development to establish habitats common in Scotland, which are used in teaching and learning, and to increase the biodiversity of the school grounds. In Inveraray the habitats are also used during play. In both schools habitats developed in the school are used to develop stewardship through an emphasis on the development of knowledge, informed attitudes and skills.

In both schools some EE projects were started to enter a competition (at Inveraray The Sky Above the Earth Below competition; at Currie High five S6 pupils entered a competition to improve a square mile of their local environment. This triggered the school grounds development programme). Some projects started as a result of a school initiative linked to funding by partner organisations (the School Grounds Development programme at Inveraray Primary, and the S1 ESD dedicated course – Currie High).

In the Scottish context the environment is seen as something ‘wonderful’, that pupils need to be encouraged to be curious about, and get in touch with. The aim of developing wonder and enjoyment in the environment is so that learners may learn to care for and value it. The hope is that if they learn to care and value it then in the future they will make pro-environmental decisions.

The problem base in the two rural schools of Mahuwe and St Margaret’s are the same, and are common to most school communities in communal areas such as Mahuwe and Hwedza. These are well outlined by Nyika (2001b) and described in full on p.238. Local problems suffered by Mahuwe are outlined on p.238 while those affecting St Margaret’s Primary are outlined in p.276.

The response of these two schools is determined in part by their geographical location. Mahuwe is a CAMPFIRE area. CAMPFIRE Science Exhibitions are held in these areas and Mahuwe participates. The school also participates in the TGTC and Enviro-Action Schools Competitions.

St Margaret’s Primary School participates in the TGTC Competitions, and the SCOPE programme. St Margaret’s currently does not take the top prizes in the TGTC Competitions, as some of the critical criteria of this competition are incongruent with permaculture principles and practice.

Improved academic performance, if only due to curriculum concepts and skills overlap with EE programmes, is a key motivator for the participation of both schools in these programmes. At St Margaret’s the use of the Permaculture Food Forest as a teaching aid or resource is emphasised as important in view of the near non-existence of teaching aids in the school. There are very few textbooks for the pupils, and no magazines, pictures, or videos, and no access to the Internet.

The EE activities in the Zimbabwean cases are guided by the following values:

- Pupil participation in conserving natural resources as future custodians of these natural resources,

- Pupil participation in activities that impart self-reliance and survival skills,
- Communal schools being satellites of new knowledge.

In both schools there are socio-economic imperatives for these EE activities. The poverty inherent in both areas due to the factors outlined by Nyika (2001b) has resulted in a strategy that links natural resource conservation to enhanced livelihoods. Although utilitarian this strategy has, in my opinion, a touch of brilliance about it. Environmental education projects in the schools are formulated in ways that ensure that school communities and the surrounding areas find it desirable to carry out natural resources conservation because this results in material benefit to them. The potentially high pupil drop-out rate in both areas due to socio-economic pressures means that the emphasis on self-reliance and survival skills finds immediate application and keeps some pupils in school. Zimmerman's (1996) review of the relationship between knowledge, affect and environmental education found evidence that there is a minority subculture (among Afro-Americans) whose concern is focussed more on social rather than environmental problems. The evidence points to the fact that the idea that environmental problems are also social problems and everyone's concern is difficult to accept for children who are worried about having their basic needs met. This is why linking sustainable livelihoods to good environmental citizenship as is seen in the Zimbabwean context seems such an excellent and appropriate strategy.

In contrast, in Scotland skills development in the case study schools is limited greatly by the fact that there is little useful application within the school curriculum structure for skills related to environmental citizenship. In the Zimbabwean cases, the fact that skills learnt are applied to solving real problems means that practical EE takes place, with plenty of scope for skills acquisition, application and practice.

In the Scottish cases, it would appear that teachers need to make more of an effort to convince learners of the importance of their biophysical environment because they (learners) seldom have occasion to interact with it for any of their basic needs. In the Zimbabwean cases, especially as these are rural schools, learners closely interact

with the biophysical environment daily. Thus they probably find it easier to conceptualise the links between the biophysical, social and economic environments.

In the two Scottish case studies no social and economic imperatives were mentioned for the implementation of EE programmes. In Zimbabwe on the other hand, there are critical social and economic imperatives that make the success of EE programmes extremely important. These include pupils' nutrition, protection from diseases like HIV/AIDS and their impacts, protection from the weather, and so on. Again in contrast to Scotland, because of the socio-economic context of these rural areas, learners are involved in food production and other household tasks and their pro-environmental knowledge, attitudes and skills impact immediately on the environment through their everyday practices. However this is only if learners are empowered enough, or feel empowered enough to effect changes to the way they do things and impart the knowledge to their guardians.

In both Scotland and Zimbabwe improving academic performance is a key motivator for the uptake of EE programmes that develop an outdoor classroom. Although this is not stated explicitly at Currie High it is implicit in the painstaking care with which the outdoor classroom has been created for use at all levels of the curriculum.

In Scotland the emphasis on pupil participation in school grounds development and outdoor activities is an idealistic one, where the purpose is to develop pro-environmental attitudes and values that will affect future decision-making. In Zimbabwe the emphasis on pupil participation in such activities is a very pragmatic one, where the emphasis is on pupils as current and future custodians of natural resources, and also survival of the pupils and their communities. One could go as far as conclude that if EE programmes in Zimbabwe fail today the cost is felt today, in human, plant and animal lives, as well as in the future. If, on the other hand, EE programmes were to fail today in Scotland, there would almost certainly be no cost to human lives, relatively little cost in plant and animal lives today. In the future however, because of the power the western society as decision-makers in the 'global village', the impact may be extremely significant. Although motivations may differ,

one would conclude that EE is equally important in both cases and educators and governments cannot afford to fail to deliver it successfully in both the developed and the developing world.

ENVIRONMENTAL CITIZENSHIP BENEFITS

Based on the literature review of predictors of environmental citizenship behaviour (p.43) Hungerford and Volk's (1990) Model (see Figure 2.2) is used in Table 8.1, Table 8.2 and Table 8.3 to summarise the impact of individual EE programmes in the three schools: Currie High, Mahuwe Primary and St Margaret's Primary School. A similar study for Inveraray Primary School may be found in Figure 5.1 and

Figure 5.2. The basis of these summaries is individual EE programmes' impact theories. Table 8.1, Table 8.2 and Table 8.3 thus represent, to a large extent, a summary of the impact of EE programmes running in individual case study schools. This summary is made possible by the use of programme theory as an organisational framework for the large amount of raw data collected on each programme. It also demonstrates programme theory's usefulness in making explicit previously tacit important stakeholders' knowledge, while summarising a large amount of previously fragmented knowledge.

Figure 5.1 and

Figure 5.2 Behaviour Flow Chart: Variables involved in Environmental Citizenship Behaviour – Butterflies, and Planet.com Topics.reveal that the outcomes of the Minibeasts, Rubbish and Recycling, Butterflies, and Planet.com topics at Inveraray Primary School develop predominantly *Entry-level* predictors of environmental citizenship behaviour. Specifically they develop knowledge of ecology, environmental sensitivity and they work to develop appropriate attitudes towards pollution, technology and economics. The impact theories of the other two programmes examined, Maths in the School Grounds and The Sky Above The Earth Below Competition, do not reveal additional predictors to Environmental Citizenship Behaviour. A deeper psychological analysis of the impact of the whole process on the children may reveal otherwise, but statements by the teachers and related

programme documents do not articulate these distinctly. There is minimal development of *Ownership* and *Empowerment* variables.

Table 8.1 Predictors of Environmental Citizenship Behaviour at Currie High

Entry-level variables	Ownership variables	Empowerment variables
<p>Environmental sensitivity</p> <p>None recorded from evidence found at the school.</p>	<p>In-depth knowledge about issues</p> <p>S1 and S2 ESD course results in an in-depth knowledge about specific issues, e.g. litter, waste management, energy, the human ecology.</p> <p>Animal Lovers Group results in an in-depth knowledge about issues regarding animal welfare</p> <p>Personal investment in issues and the environment</p> <p>Once they have an in-depth knowledge of the issues S1 and S2 ESD pupils display a greater willingness to participate in conservation activities within the school. <i>The low numbers of students participating in Conservation Currie belies this assumption.</i></p> <p>An in-depth knowledge of animal welfare results in a personal identification with the issues to the extent that pupils participate voluntarily in fund raising activities and community action at a local SSPCA rescue centre.</p>	<p>Knowledge of the skill of using environmental action strategies</p> <p>Conservation Currie pupils develop their interest in living things while learning conservation skills. Currie High will sponsor a pupil in Kenya. This will give them the experience of taking action and making a difference.</p> <p>Through the activities of the Animal Lovers Group pupils learn activism by fund-raising to support specific campaigns and raising relevant issues to the rest of the school.</p> <p>Locus of control</p> <p>Success in conservation and grounds development activities by Conservation Currie participants increases group and individual locus of control.</p>
<p>Minor variables</p> <p>Knowledge of ecology</p> <p>Formal and informal teaching and learning activities at school Ecology sites.</p> <p>Attitudes toward pollution, technology and economics</p> <p>Formal and informal teaching and learning activities at Ecology sites lead to pupils who have an interest, an awareness and respect for the living world.</p> <p>In-depth knowledge about the issue by S1 and S2 ESD course pupils results in an understanding for the need to change attitudes and behaviours.</p>	<p>Minor variables</p> <p>Knowledge of the consequences of behaviour</p> <p>None recorded from evidence found at the school.</p>	

Table 8.2 Predictors of Environmental Citizenship Behaviour at Mahuwe Primary School

Entry-level variables	Ownership variables	Empowerment variables
<p>Environmental sensitivity</p> <p><u>POEMS</u>: Pupils develop a sensitivity to the requirements of each Audit Zone as they work in it, and during whole school visits to all Zones for evaluation purposes</p> <p><u>POEMS and CAMPFIRE Science Exhibitions</u>: Pupils are taught to make collections in an environmentally friendly manner</p> <p><u>POEMS</u>: HIV/AIDS education results in responsible adults who are prepared to assist/support HIV/AIDS victims.</p> <p>Knowledge of ecology The <u>Enviro-Action Schools Competition</u> encourages pupils to undertake practical projects studying nature and acquiring an understanding of the interdependent web of life.</p>	<p>In-depth knowledge about issues <u>POEMS and CAMPFIRE Science Exhibitions</u>: Collections: Pupils carry out materials and non-material collections on topics with an environmental message and an impact on the community</p> <p><u>POEMS and CAMPFIRE Science Exhibitions</u>: Investigations: Pupils analyse local situations and problems and identify their root causes.</p> <p>School EE projects for Enviro-Action Schools competition involve pupils in in-depth study of local environmental problems.</p> <p><u>POEMS</u>: Knowledge and awareness about HIV/AIDS issues</p> <p>Personal investment in issues and the environment <i>Pupils' thorough understanding about local problems makes them strongly identify with them. This could translate into a 'personal investment' in the specific issues (Speculative)</i></p> <p><u>POEMS</u>: Some pupils begin similar income generating projects as the school at their homesteads</p>	<p>Knowledge of and skill in using environmental action strategies <u>POEMS and CAMPFIRE Science Exhibitions</u>: For all the local problems pupils are asked to suggest solutions. In the Design, Recipe and Technology section pupils design solutions. Consequently pupils are equipped with skills to solve environmental problems.</p> <p>The school and pupils are part of stakeholders who pull together ideas and resources to solve local environmental problem highlighted through the <u>Enviro-Action Schools Competition</u>. This may include legal action stemming from Environmental rights education.</p> <p>Pupils develop knowledge and skills of pollution control strategies, e.g. Clean Up the World Campaigns</p> <p>Locus of control Increased group locus of control as group designs useful solutions to a local problem. (<u>POEMS and CAMPFIRE Science Exhibitions</u>)</p> <p>Increased when the school patents their project and there is uptake of the ideas within the community and by big firms (<u>POEMS and CAMPFIRE Science Exhibitions</u>)</p> <p>Increased when community problem solving plan is put into action through their <u>Enviro-Action Schools</u> project having highlighted the issue as a problem.</p> <p>Increased when school models result in community Orchards and Gardens (<u>POEMS</u>).</p>
<p>Minor variables</p> <p>Attitudes towards pollution, technology, and economics</p> <p><u>POEMS</u>: Once pupils experience the usefulness of the Garden, Orchard and Plantation in the school their attitude to the work involved changes. They are more interested in participating</p>	<p>Minor variables</p> <p><u>SCIENCE Exhibitions</u>: Knowledge of the root causes of local environmental problems results in a knowledge of the consequences of behaviour</p> <p><u>POEMS</u>: Awareness of HIV/AIDS issues results in responsible adults, prepared to assist/support HIV victims</p>	

Table 8.3 Predictors of Environmental Citizenship Behaviour at St Margaret's Primary School

Entry-level variables	Ownership variables	Empowerment variables
Environmental sensitivity Learners are encouraged to live in harmony with nature. The sensitivity to the environment that permeates the school's environment is evidenced by the success with which the school orchestrates the solution of these problems, from the whether to the health of the pupils.	In-depth knowledge about issues Children taught the skills of goat rearing, bee keeping and organic gardening according to Permaculture principles Personal investment in issues and the environment The environmental problems that the school grapples with are the same as the ones that pupils face at home, so pupils relate very strongly to the issues. There is evidence of pupil uptake of these ideas and practice at home., as well as pupils – guardian transfer of knowledge and practices.	Knowledge of the skill of using environmental action strategies This knowledge and skill is lavishly demonstrated in the Impact Theories that show the application of these in the school and the community
Minor variables Attitudes toward pollution, technology and economics School based environmental action leads to pupils taking pride in their school, and having positive attitudes and values.	Minor variables Knowledge of the consequences of behaviour The involvement of the children in identifying the problem, deciding on the solution, planning, implementation, and evaluation of the results, in view of the fact that most of these problems are common to their homesteads, results in a knowledge of the consequences of behaviour - both positive and negative.	

As we move on to S1 and S2 at Currie High we see a further development in Knowledge of Ecology as well as appropriate Attitudes. There is an apparent increase in the development of *Ownership* and *Empowerment* variables. Primarily as a result of the S1 and S2 ESD course pupils develop an in-depth knowledge about issues, and there is evidence of personal investment in environmental issues. These are both *Ownership* variables. The school is sponsoring a pupil in Kenya and as a result pupils will experience the reality of taking action and making a difference, an *Empowerment* variable.

The variables developed by Conservation Currie activities and the activities by the Animal Lovers Club need to be qualified. Conservation Currie is a voluntary group

of 8-10 pupils, of which only a fraction are in S1 and S2. The Animal Lovers Club was a voluntary lunchtime club that met for 45min every Tuesday. This group has since stopped meeting. This information was revealed during the iteration phase of the research. The teacher explained the reason for this as lack of time on her part to co-ordinate and organise the Club's activities. The programme has been retained in the analyses of EE programmes at the school because it was happening at the time of data gathering and it has made an impact in the school that probably persists within pupils and staff. Average attendance to the Club when it was running was 15, with a minimum of 10 and a maximum attendance of about 20. Attendance was by mostly S1, S2 and S3 pupils. My analysis of the programme's Impact Theory shows that the issue-based nature of the activities, the fundraising, as well as collections for a local animal charity, helped to develop an in-depth knowledge about the issues and a personal investment in those issues (as evidenced by enthusiastic voluntary participation in related activities). These activities resulted in practice in using action strategies. Although the outputs of these two voluntary groups are strong and characterise the higher levels of predictors to environmental citizenship behaviour, they are limited to a very small percentage (ranging from 0.8% to 2%) of the total school population. The most significant results must therefore be those that are a result of the dedicated S1 ESD course, and the cross-curricular S2 ESD course. These are almost exclusively *Entry-level* and *Ownership* variables.

The result of environmental education activities in the two Scottish cases therefore, reveals the development of predominantly *Entry-level* and *Ownership* variables involved in environmental citizenship behaviour according to Hungerford and Volk's (1990) model.

Mahuwe Primary School's behaviour flow-chart of variables involved in environmental citizenship behaviour shows that the school's programmes develop all three categories of variables, *Entry-level*, *Ownership* and *Empowerment* variables. These outputs however have to be qualified. Only pupils who are in the Science and Research Audit Zone in the school take part in the Enviro-Action Schools Competition. This involves 30 selected pupils, who are the best performers from

selected Grade 4 to 7 classes. Deliberately, the activities of this Audit Zone are organised around the requirements of the CAMPFIRE Science Exhibitions. Key tasks carried out in the Zone include investigating, collecting, designing and making gadgets and recipes. Pupils are divided into three teams, the Collection Team, the Investigation Team and the Design Recipe and Technology Team. Pupils are rotated around different Teams within the Zone. It is worthy of note that this Zone is the one that produces entries for the CAMPFIRE Science Exhibition, and for the Enviro-Action Schools Competition. The school has a policy of rotating pupils from zone to zone during the course of their school career. Thus pupils in the Science and Research Zone are rotated, albeit only to be replaced with high performers from other classes. Although it may appear that a limited number of pupils are challenged by these competitions, at any one time nearly 6% of pupils in the school (the school has a roll of around 550) are taking part in activities related to these competitions as part of the Science and Research Audit Zone. Although no research was done into the extent to which this may be true, the success the school has achieved in these competitions may highlight the projects to the rest of the pupils in the school, who also have access to the project reports. It is also highly likely that teachers within the school will discuss winning projects with their classes, as well as any community developments arising as a result of these. It is conceivable therefore that there is some transfer of the knowledge and lessons learnt, and hence transfer of consequent predictors of Environmental Citizenship behaviour, from the Science and Research Audit Zone pupils to the rest of the school. Clearly such extrapolations should be treated with caution.

From the analysis of Environmental Citizenship Benefits of the programmes at Mahuwe Primary, it is evident that the POEMS programme, the Enviro-Action Schools Competition and the CAMPFIRE Science Exhibitions are providing opportunities for modelling *being* good Environmental Citizens. All aspects of environmental citizenship (1) to (5) as defined by Hungerford and Volk (1990) are covered to varying extents.

The nature of the present investigation means that no evidence was collected on the occurrence of a personal investment in issues and the environment, and intention to act. Any indication of the development of these is a result of anecdotal evidence from teacher interviews or speculative. Other than these the programmes at Mahuwe develop, to some extent, all other major variables in the three categories, *Entry-level*, *Ownership* and *Empowerment* variables. Nonetheless at St Margaret's Primary School teachers do offer anecdotal evidence pointing to the development of a personal investment in issues and the environment, and a strong intention to act.

My analysis of activities at Mahuwe Primary School indicates that the reason programmes seem to achieve not only *Entry* and *Ownership level* but also *Empowerment level* predictors of environmental citizenship behaviour, stems from the community outreach element of the school's activities. The fact that school programmes seek solutions to problems that may occur at the school, but are echoed in the community means that these projects often find real use within the community.

As a researcher, however, I got the impression of fragmentation in the school's activities. This stems from the fact that the activities in one part of the school sometimes contradict activities going on elsewhere in the school. An example is the fact that the school has a Pollution and Control Audit Zone. In this zone the problem of litter is discussed. The whole school takes part in Clean Up the World Campaigns in the town centre, where a major activity is picking up litter. However, there are no household waste disposal facilities at surrounding teachers' houses. Just outside the school perimeter teachers dispose of all household waste onto the surrounding grassy area. It is an absolute eyesore and a taken for granted fact of life. Another incongruent aspect is the expansive gum plantation that takes pride of place at the perimeter of the soccer fields. Mahuwe is a low rainfall area, and gum trees are known to absorb a tremendous amount of water from the ground in order to grow. The school garden suffers terribly from a shortage of water, due to the borehole just not having enough water. The school however is running these two opposing projects with equal enthusiasm and does not appear to be aware of the contradiction.

When I looked at the impact theory of the activities at St Margaret's Primary School I was hard-put to identify any predictors of environmental citizenship behaviour. This surprised me at first, until I realised that what I was looking at *was* environmental citizenship behaviour, not the process of building predictors of it.

The impact theories of the Permaculture programme at St Margaret's embody environmental citizenship attributes (1) to (5) coined by Hungerford and Volk (1990). The activities at the school result from a great sensitivity to the social, economic and biophysical environment of both the school and the community; an in-depth knowledge and understanding of the issues; a school (and, to a certain extent, community) investment in these issues; knowledge and skill in using environmental action strategies; internal group and personal locus of control and a whole school decision to act.

The level of outcomes attained by the SCOPE Permaculture programme at St Margaret's stem from the purpose of the programme. It is an environmental education programme that uses permaculture and an Integrated Land Use Design (ILUD) as tools for sustainable environmental management, promoting healthy environments and sustainable production and land-use. In addition it works to develop an environmental education curriculum that is centred on building an understanding of, and application of the ecological principles on which sound land use practices are based. Hence its purpose is not only environmental education based on the concepts of sound land-use, but the establishment of institutions at which these are practiced, and practiced in a sustainable way. The reason why this programme is successful at St Margaret's is that it solves *real* problems that the school and the community are facing. The programme is not a package deal. It has evolved during the piloting phase to incorporate practices that were deemed desirable in view of the context. This has included the inclusion of practices that contribute to sustainable agriculture, such as minimum tillage, agro-forestry and use of appropriate technology. The programme is based on the philosophy that schools can be satellites for new knowledge and from them 'new' knowledge can be spread into the rest of the community. Because the intention and the result is that the school becomes a

model to the community of good environmental citizenship, this is practiced at the school by staff and pupils while the principles are being taught. It is therefore a practical EE programme. This has the result that the school does not dwell on the development of predictors of environmental citizenship behaviour, but rather on environmental citizenship behaviour itself. The staff and pupils and members of the community learn environmental citizenship by practicing it.

There is a holism in the activities taking place at St Margaret's that is probably brought about, if only in part, by the fact that only one EE programme is running at the school at the moment. The same cannot be said for Mahuwe, and therein is the source of one of the incongruent aspects of the school's programme. The gum plantation is the product of the Forestry Commission's TGTC Competition. This encourages the growing of plantations of fast growing exotic trees. The primary aim of this competition is to reverse deforestation and provide fast growing alternatives to the use of native trees for firewood and poles. Native trees take longer to grow and so growing gum trees seems a logical solution. This however does not take into consideration the arid conditions of Mahuwe. The school did not take the presence of the gum plantation into consideration when it began (in 1996) and then continued (in 2002 under the POEMS programme) to maintain a school nutrition garden and an orchard. There seems to be a wish for the school to continue to win prizes under the TGTC Competition, and therefore wants to maintain the gum plantation. The TGTC competition looks for the presence of such plantations as a key evaluation criterion. The school also sells poles to the community from the gum plantation. So it is a desirable source of revenue.

The problems outlined above represent a case for greater collaboration between NGOs and government organisations that come into the school with programmes. It also makes a case for more information sharing between such organisations. The SCOPE programme is well aware and informs its schools of the incongruence of growing gum plantations in low rainfall areas where crops and fruit trees are also required to grow, and where a high water table is critical for the availability of water

from boreholes and wells. The fact is either not known to the Forestry Commission, or if it is, they have not shared this with the schools.

The case for greater collaboration is made also by the fact that pests are seriously damaging the school garden and some of the Community Nutrition Gardens. This problem has been solved at St Margaret's using permaculture principles of natural pest repellents, and 'living in harmony with nature'. The Forestry Commission, SCOPE and Environment Africa would do well to collaborate so that schools get holistic information before they begin programmes. I observed a great deal of frustration that sometimes bordered on near hopelessness at the problems with water and pests at Mahuwe. There was no mention, during the course of this research, of NGOs that began these programmes assisting the school and community to solve these problems.

In conclusion, therefore, I would say that EE programmes in schools in the two case study schools in Scotland develop predominantly *Entry-level*, and *Ownership level* variables of environmental citizenship behaviour. Environmental education activities in the Zimbabwean case studies develop *Entry-level*, *Ownership* and *Empowerment* variables involved in environmental citizenship behaviour, with St Margaret's Primary's Permaculture programme to a greater extent than Mahuwe Primary, taking pupils and staff beyond the development of predictors, to practicing environmental citizenship. The reason this seems to happen in the Zimbabwean context and does not happen in the Scottish context is that the EE activities in Zimbabwe have a strong community outreach component which is deliberate and which is based on the policy that schools should be satellites of new knowledge in their communities.

SOCIAL AND COMMUNITY DEVELOPMENT

The contribution of Zimbabwe's two case study schools to social and community development

The Ministry of Education's policy for schools to be satellites of new knowledge within their communities is embodied in the statement:

The education system should extend to the community for it to be successful and useful. As long as any school programme is not benefiting the local communities but remains within the four walls of the classroom, then its efforts come to nought. Education to be useful must

transform the lives of the people around the school (*Regional Director for Mash. Central Region. Official opening of the 6-10 January 1997 CAMPFIRE Science Exhibition Workshop for Teachers*).

Both Mahuwe Primary School and St Margaret's Primary School have a community outreach policy. There is a deliberate emphasis in both schools to encourage community uptake of school programmes. At Mahuwe Primary this is through modelling nursery, orchard, plantation and nutrition garden raising, as well as assisting and training interested community members on the up-take. It is through highlighting, and suggesting solutions to local problems. It is also through participating in community problem-solving efforts, and facilitating community capacity building. It does this through being a community resource for fruit, vegetables, poles, and expertise.

St Margaret's Primary does this through modelling permaculture and good environmental citizenship as a school, and through one of the teachers piloting permaculture at his homestead. The school actively markets permaculture on School Open Days and Permaculture Open Days, as well as other social forum in the community where teachers can get a platform. Two teachers within the school are SCOPE Trainers-of-trainers. Teachers and pupils, on invitation, go to local homesteads to assist community members develop permaculture homesteads. Teachers do the same on invitation to other schools. The school is a community resource. It is a source of fruit, tree seedlings, herbs and knowledge. The schoolteachers, through the Permaculture programme, have amassed a wealth of knowledge of herbal cures. They generously teach pupils the names of these and their curative and culinary functions. Pupil-to-guardian transmission of this knowledge occurs. Further, the teachers administer treatment to sick members of the community as well as pupils. The school is also home to the orphans' Nutrition Garden, a community resource.

The contribution of Scotland's two case study schools to social and community development

At Inveraray Primary, there is no evidence of a thrust by the LA and/or the school to ensure that school EE programmes are taken up in the community. Any benefits of the EE programmes to the community are purely incidental.

According to its prospectus the *School Aim* of Currie High is to guide and help each student to mature towards his or her full potential. To achieve this for all the students the school aims to, among other things, provide a high quality programme of education and recreation for the local community through the operation of the Currie High School Community Programme (Currie Community High School Prospectus, 2004). The school was refurbished in 1998 and throughout planning discussions for the refurbishment a priority was to see the school become a learning and recreational resource for the community. Thus a Community Lounge has been created together with a crèche. An astro-turf pitch has been provided and the P.E. block has been upgraded and includes two gymnasias, a fitness suite and a swimming pool. Pupils and the community extensively use the school playing fields, including the astro-turf pitch, both during and after the normal school day. The school operates a community programme offering educational, leisure and recreational opportunities for the local community (Currie Community High School Prospectus, 2004). Currie High prides itself on being a vibrant and forward thinking Community High School committed to the development and promotion of the school as a multi-purpose venue for community use. The school enjoys good links with the local community and is actively developing this relationship by offering a quality programme of day, evening and weekend courses in a friendly and supportive atmosphere (Knight, 2003). The school holds Community Education Classes involving EE and ESD. The environmental education coordinator also works with a community group that does practical woodland management. The school is host also to visits from various community groups including other schools.

The school's policy of habitat replacement has seen an improvement in biological diversity both within the school and in the surrounding area. Further the school has become a resource of CPD for in-service teachers in the Council on school grounds developments, and a learning resource for Higher National Diploma students on

Conservation and Environmental Education Management courses at one of the local colleges. The role of the school as a pilot in the SSSP has seen the school spearhead the development of an ESD course for S1 and S2, which may be 'rolled out' if it is deemed a success.

Currie High is thus a community school and is acting as a satellite of knowledge for the surrounding community, much in the same way as Mahuwe and St Margaret's Primary Schools are in their own communities.

PERSONAL DEVELOPMENT

ACADEMIC/COGNITIVE BENEFITS

In all four case-study schools there is an acknowledgement of the academic/cognitive benefits of teaching in the outdoors.

A common theme in two Scottish case studies is habitat replacement, while at the same time creating 'an outdoor classroom'. Whole school involvement is possible at primary level in school grounds developments. At the S1 and S2 level, which falls in the secondary school while remaining part of the primary school 5-14 'curriculum', the extent to which pupils can be involved in school grounds development is limited by the structure of the secondary school curriculum. At this level involvement in school grounds development and maintenance is on a voluntary basis. As few pupils actually volunteer for this, by-and-large the cognitive benefits related to school grounds development and maintenance are minimal. At both primary and secondary level individual teachers are free to be innovative in the way they incorporate the outdoor classroom in their teaching and learning activities. There is a move in both schools to develop structured curriculum activities that use the outdoors to teach core-curriculum concepts.

In the case of Zimbabwe at St Margaret's the food forest that has been created at the school through the permaculture programme is used as a learning resource. The school has a policy that requires teachers to integrate permaculture into their formal teaching. This means that teachers are required to take all suitable opportunities

during their teaching to highlight permaculture principles, and to use the food forest as a teaching resource. Workshops are done periodically to illustrate ways in which this can be done. It is thus 'an outdoor classroom' in much the same way as the Scottish case study schools. The fact that for two hours a week pupils are taught Permaculture by a trained Permaculture teacher as part of the Environmental Science time allocation, means that this EE programme is an integral part of the core-curriculum. At Mahuwe the activities in the Audit Zone are separated from the core teaching time. Audit Zone activities take place in the afternoons, between 2pm and 4pm Mondays, Tuesdays, and Thursdays. A similar division of the school into Audit Zones takes place at St Margaret's. Audit Zone development and maintenance activities are slotted into the afternoons after formal teaching time.

At Mahuwe Primary academic benefits are through the overlap of topics and skills in the core-curriculum and those covered in the action projects and competitions.

In all cases, except at Currie High, pupils are involved in the development of the outdoor classroom. In Zimbabwean cases pupils are also primarily responsible for the maintenance of these sites.

The results of this study imply that in situations where outdoor teaching activities are an integral part of the core-curriculum then the 'outdoor classroom' is used to teach all curriculum areas. This is the case with St Margaret's and Inveraray Primary Schools. At Mahuwe academic gains are through the overlap of action projects and competitions' knowledge and skills with those required by core-curriculum areas. This includes problem-solving and science process skills related to 'collections, investigations, design and technology'. The Environmental Science syllabus looks at collections as a way of teaching that makes pupils aware of their environment. The connection between teaching outside and cognitive benefits is well supported by research.

The case made for the cognitive impacts of EE activities, as summarised in this section, is supported by published research that has shown that students from schools

that included natural and community setting local environment as a context for learning, using problem-based instruction and learner-centred methods score higher than traditional classrooms in reading, science and mathematics (Rickinson et al., 2004, p. 34). The authors cite findings by Moore and Wong (1997), who carried out a detailed study of the impact of school grounds development in a US school. School ground learning experiences were found to help students increase their inquiry and questioning skills (p. 35).

Research by the Education Development Centre in Boston (2000) sent questionnaires to 200 educators involved in school grounds programmes in four countries (Finland, Sweden, the UK and the USA). Sixty percent of the respondents felt that their school garden programmes improved academic learning. Disinger and Lisowski (1991) found that field-based programmes in the sciences are effective in assisting students' understanding and retention of selected ecological concepts. They demonstrated that abstract concepts were taught and learned effectively through experiential field instruction. Piagetian theory, also, advocates that provisions for direct experiential, relational opportunities assist and enhance learning (in Lisowski & Disinger, 1991). Simone (2002) also discovered a relationship between school ground greening and academic performance. Students in Grades 3 and 6 attending schools with green grounds performed better on province-wide standardised tests than those students who did not.

Research has shown that having a school garden or working farm on-site at a school has the advantages of academic enrichment (Eden, 1998), development of the knowledge of agricultural practices, including finding out alternatives to pesticides (Canaris, 1995), and that teachers utilise the new space as an outdoor classroom. This results in connections between children's play experiences and the formal curriculum (Moore & Wong, 1997), deeper scientific understandings of the food cycle, evolution and environmental management (Rahm, 2002), greater increases in observational, communication and comparative science processing skills (Mabie & Baker, 1996), is cross-curricular and provides opportunities to learn about different sources of food and parts of plants (Alexander et al., 1995). In Poulsen (1992) a teacher describes her

experiences guiding a group of six and seven year olds to design and build a small farm on the school grounds in Georgia, USA. She found that the farm, its design and its maintenance touched a great deal of the curriculum. Similar kinds of findings are reported in relation to school gardening in the Shiga Prefecture in Japan (Konoshima, 1995) and aquaculture programmes in New England secondary schools in the USA (Wingenbach et al., 1999).

AFFECTIVE BENEFITS

At Inveraray Primary and Currie High outdoor activities aim at developing interest, care and respect for living things. In caring pupils are encouraged to take personal responsibility.

At Inveraray there is a drive to make pupils less self-centred, aware of their global citizenship, with responsibilities to other life forms and other peoples who may be far away. There is an attempt to make them understand the impact of their decisions and actions and encouragement to take responsibility and be considerate to others.

At Currie High the school hopes to widen pupils' vision and scope by teaching rarely used traditional skills such as basket weaving and gardening. Getting them 'in touch' with the living world is important and is a result of the conviction that pupils often spend most of their time indoors. A study of its impact theory shows that Conservation Currie is used to develop a work ethic, build self-esteem through peer-mentoring, successful accomplishment of tasks and learning conservation skills. Literature has documented that involvement of students in school ground developments and maintenance results in heightened self-esteem, improved morale and a reduction in truancy levels (Titman, 1994, pp.110-111). The constraints on the degree of pupil involvement in school grounds ecology sites and maintenance tasks mean that only a very limited number of pupils benefit from these activities at S1 and S2 levels. The impact theory for the dedicated ESD course for S1 (see p.178) indicates that the course cultivates an understanding of the need to change attitudes and behaviour.

At St Margaret's Primary School EE activities under the Permaculture programme aim to motivate learners through environmental action to have respect, pride and care for their school environment, and develop positive attitudes and values toward the environment in general. At Mahuwe pupils' interest in the tasks they carry out in the Audit Zones increases through their participation in the process of producing and marketing the crops. They are more willing to participate and display ownership through more conservative behaviour within the school.

In both St Margaret's and Mahuwe therefore pupil participation in the whole process of development, maintenance and marketing (at Mahuwe only) as well as sharing in the real benefits of the programme draws pupils into an appreciation of their environment, resulting in pride and care for that environment.

One is immediately struck by the difference in the degree of involvement between the Zimbabwean cases and the Scottish cases. Certainly at Inveraray the pupils are very much involved in school ground developments, and the grounds are extensively used for teaching and play. At Currie High the school employs a Environmental Projects Coordinator and there is a volunteer who works extensively on the school grounds development and maintenance. There is also a school gardener who maintains the formal school garden areas.

In Zimbabwe school grounds developments are linked to the children's physiological needs, i.e. the need for food and medicine. The school grounds developments are also linked to the school's needs, i.e. shelter from the weather, raising much needed funds for administration and teaching requirements, and for sustaining the EE projects. At Mahuwe Primary there is a classroom block that was built from one year's proceeds of selling trees from the nursery to the Forestry Commission.

Studies by Borden and Schettino, 1979 and Horsley, 1977 have confirmed that changes in environmental attitudes and behaviour are most effectively brought about by Environmental Values Education (EVE) strategies that increase the learner's level of knowledge, amount of emotional involvement, and experience in the area being

addressed. The analysis of the Permaculture programme reveals that the programme meets the three criteria of EVE.

BEHAVIOURAL IMPACTS

In the two Zimbabwean case studies, the problem of pupil behaviour was not mentioned as a motivation for learning outdoors. Teachers at St Margaret's however did mention that pupils' behaviour at playtime and other times in the outdoors improved after the development of the school grounds. Pupils were more respectful and proud of their school environment. There were less cases of vandalism of school plants. At Currie High pupil behaviour was not mentioned as a factor in the entire school grounds development programme. At Inveraray Primary teachers were encouraged to take pupils outdoors in the afternoons especially to curb restlessness, which led to disruptive behaviour, and to cater for different preferred learning needs. Specific behavioural effects of outdoor learning have been documented in literature as calming effects, reduced vandalism, a reduction in aggression, accidents, incidents of damage, vandalism and littering (Skamp & Bergmann, 2001 in Rickinson et al., 2004; Titman, 1994, pp.110-111).

NUTRITIONAL BENEFITS

At no stage were nutritional considerations mentioned as a motivation for school grounds developments in the two Scottish case study schools. This was however a critical consideration at St Margaret's Primary School and a relatively important consideration at Mahuwe Primary. Therefore these EE programme are also a nutritional intervention. The reason why nutritional considerations are less critical at Mahuwe Primary School is that there is an existing scheme whereby a donor donates bags of *Mahewu* powder. This is used to make a traditional partially fermented grain-based nutritional drink. This is made each afternoon and pupils are given to pupils at break time. The scheme was begun as a result of a realisation of the nutritional crisis in the school.

VOCATIONAL BENEFITS

At no time were vocational benefits mentioned in the two case studies of Scotland. At Inveraray it was suggested that as a result of the increased interest in the living

world some pupils may take up hobbies such as bird watching, and may in general prosper in their lives. In the Zimbabwean cases the need for pupils to learn survival and self-reliance skills is a critical consideration. This is because of the socio-economic background of the pupils. A lot of the pupils are carers of old or sick guardians who often cannot afford schools fees. This results in the pupils either dropping out of school, or having to send themselves to school. If they drop out and are thus no longer able to follow the academic ladder leading to formal employment, they will need to be able to sustain themselves through income generating projects. It is practical skills and knowledge of environmentally friendly income generating projects that EE projects in the two Zimbabwean schools seek to develop in pupils. Some pupils begin such income-generating projects successfully while they are still in school.

SCHOOL DEVELOPMENT

In all four case study schools success in school grounds development has brought more funding, donations, and opportunities. This has led to a general development of the school. St Margaret's is now the largest school in the area. This is due to teachers and pupils preferring to attend that school, compared to other local schools. According to the TIC for Permaculture at St Margaret's this is due to the fact that the school is very green and attractive, there is plenty of food and water and the school has electricity, unlike a lot of surrounding schools.

At Mahuwe a school borehole, fencing and garden equipment were donated to start the school nutrition garden. A classroom block has also been built from the proceeds of the school tree nursery. At Inveraray Primary the headteacher's enthusiasm, and the work that was already going on the school, resulted in the school being selected as a demonstration school. This resulted in a large grant to support the school's grounds development programme. Currie High is a flagship school in Edinburgh City Council as a result of its successful school grounds programme. It has won many awards and these have led to more success in securing funding on application, thus making the school grounds development programme sustainable.

LIMITATIONS OF THE STUDY

This research is firmly located within the qualitative research paradigm. The interpretive, naturalistic approach taken emphasises my role as an active learner who tells the story from the participants' view. The use of programme theory guided me through an active and creative role in data collection, selection and interpretation during the drawing of programme theories, for which I take shared responsibility with the responding practitioners who verified these programme theories through member-checking or iteration.

The qualitative data generated in this research is vulnerable to the same validity and reliability threats that challenge naturalistic inquiry in general. However before launching into a discussion of the limitations of this research I am going to discuss the reasons why I believe the findings of this research should be taken as a credible account of reality.

Traditional scientific research criteria are the basis of evaluation research as presented by Rossi et al. (1999) and Chen (1990), both of which are key guiding texts for the present research. Science has traditionally emphasised objectivity, so, among other things, qualitative inquiry within this tradition emphasises procedures that minimise investigator bias and emphasise rigorous and systematic data collection procedures. According to Smith (1989) interviewer (investigator) bias occurs when a study is subtly shaped to establish the investigator's preconceptions and desires (p. 131). The use of programme theory as a lens through which to investigate EE programmes in each school has built into it ways to overcome investigator bias. Purposive sampling utilised to select case study schools meant that as the investigator I had no previous attachment to any of the case-study schools. Further, programme theory provided an analytic framework for case-study data before it is collected, shaping the questions asked and the form of data collection.

Data collected through the lens of programme theory is mostly qualitative and primarily perceptual in nature. Perceptual data are those conceptions or beliefs about reality as understood by a person's senses. They may or may not represent "truth" as

concrete and objective data would show a situation to be (Smith, 1989, p. 128). The “natural” reports on experience that constitute such data can be beneficial for identifying unique impacts of a programme. They provide insight into unique experiences of respondents generally perceived to yield valuable in-depth information (Smith, 1989, p. 128 citing Smith and Lincoln, 1984).

An approach Lincoln and Guba (1985, p.109) contend is useful in establishing credibility is *peer debriefing*. During the process of this research, from early 2002 to the end of thesis writing, I met on a fairly regular basis with a colleague, who served much like the disinterested peer Lincoln and Guba describe, and discussed my research experience in an informal but fairly systematic manner. These meetings served the purpose of exploring various aspects of the inquiry during its process. He was a sounding board of working proposals, and research design decisions as they emerged from my mind, providing a platform for me to debate and justify my proposals. This process helped me clarify my ideas and forced me to rethink others. It also provided company during the lonely process of this naturalistic inquiry. The meetings often presented a constructive environment for clearing my mind of emotions and mental blocks that would be holding me back from taking the sensible next step in the research and writing-up process. This helped me to cope and made an important contribution to the completion of the writing of this thesis and its quality.

Points can be offered for and against the validity of qualitative and perceptual data of the kind upon which this study is based. Threats to the trustworthiness of the findings are presented below and where possible a statement of how the threat was minimised during the research process.

Data validation

Programme theory includes guidance for the involvement of programme personnel at various stages of the research. Ideally this would include programme personnel reading interview notes and transcriptions and deciding whether they would describe stakeholder views in the same way, and negotiate the final conclusion. In this way programme personnel would validate my work as an external researcher. However

limitations in financial resources and time – on my part as well as on the part of responding practitioners – meant that it was not practical to involve responding programme personnel in analysis of interim data and interview transcripts. After the initial data collection, respondents' involvement was limited to member-checking first draft case-study reports during the iteration phase. These first-drafts were a 'data dump', containing all information I had gathered on individual school's EE programmes. This was deliberate and ensured that further data selection and refining of the case study report was based on respondent-verified information.

It was not possible, given the scale of the study to use multiple coders and calculate intercoder consistency to establish the validity and reliability of pattern and theme analysis of raw data from preliminary field research and individual case study schools. Although doing this would have been ideal for minimising researcher bias, the scale of data involved meant that this could only have been done through the employment of a full-time research assistant.

Self-report bias or evaluation apprehension

This is where participants give acceptable responses so as not to appear inadequate in some way or otherwise intentionally withhold honest thoughts (Smith, 1989, p. 131). Lincoln and Guba (1985) speak of the distortions to the data resulting from such *situated motives* as wanting to please the investigator by saying normatively appropriate things, or simply not being motivated to address the investigator's concerns fully (p. 302). This threat is thought not to exist to any great extent in the present study as I made it clear at the beginning of each interview that I was interested in the school's EE programme plan and outcome projections, as well as staff and pupils' experiences in the pursuit of these plans. The repertoire of questions asked gave constructive opportunities for respondents to express negative aspects of the programmes. Further, since it was their perceptions of the programme I was interested in there was no right or wrong answer.

Other possible distortions to the data originating from respondents could be those that stem from perceptual distortion and selectivity, a misconstruction of the investigator's questions and hence the answer given to them (Lincoln & Guba, 1989,

p. 302). While this threat does exist in the present study for responses to the postal survey questionnaire it was minimised within the case studies in that although teachers were asked to complete a 'teacher questionnaire' on the EE activities they were reporting on in response to the present study, I went over the questionnaire with them during a face-to-face interview, clarifying any ambiguities and noting additional or amended information as necessary from their verbal responses.

Purposive sampling

Purposive sampling strategies provide a limited number of case studies for examination (Patton, 2002, p. 563). The limitation of time, personnel and resources means that only four schools selected as 'good practice' examples were investigated in this research. The extent to which practice in these schools is not significantly atypical from the average school was not determined. This threat does exist for both country case studies in this research. This is because the programmes taking place in the case study schools are not taking place in *all* schools, and where similar programmes are taking place they do so under dissimilar contexts. The national survey in Zimbabwe revealed that in some schools there are no initiatives, EE or otherwise, taking place outside the normal school curriculum. It is thus possible that there may be some bias towards showing case study nations in a more positive light than would be the case generally, and may lead to too great a credibility on any weaknesses uncovered (Smith, 1989, p.131).

Investigator effects

As the researcher I was the primary instrument of data collection during this research. According to Lincoln and Guba (1985) the mere entry of the investigator disturbs the context (p. 192). There are two ways in which this could be a threat to the findings of this study. These include reactions of staff in the case study to my presence on the site and changes due to my personal development during data collection or analysis. My presence could have created what Patton (2002) calls a 'halo effect', so that staff perform in an exemplary fashion and participants are motivated to 'show off' (p. 567). I believe that there was no great threat of this in the present study as most of the evidence that was used to support claims by programme

staff was of an enduring form that could not have been artificially set up for show during the week of the case study, e.g. programme documents and school ground sites. The use of programme theory to guide the form of data collection and analysis reduced the impact of changes in me, as the investigator, during the data collection and recording process.

Lincoln and Guba (1985, p. 192) and Patton (2002, p. 567) suggest that perturbations due to investigator presence must be given an opportunity to 'damp out'. They thus recommend prolonged engagement to increase trustworthiness and support credibility. Another reason is that some more salient factors of the context take time to identify, and require a sufficient time of study for their influence to be assessed. For this research a fixed amount of time was given for each case study to be done. It is possible that this was not long enough and more salient factors of context could have been missed at individual sites. However limitations in individual school's tolerance of such prolonged, intrusive, and intensive scrutiny by an outsider, as well as a limitation of resources and time mitigated against a longer stay at case study sites.

Persistent observation, another way recommended to make it more likely for credible findings and interpretations to be produced was not possible during case studies of schools as the fact of the functioning school in full session meant that all research activities, be it interviewing, observation of classes and project activities were strictly timetabled. However as stated before it would have been difficult for any significant lies, fronts, and other deceptions that could have been planned by respondents to go undetected because the evidence requested to support claims by respondents was of an enduring kind that could not be put up for show. To further guard against such loopholes, triangulation of different modes of data collection was used (questionnaires, interviews, observations and programme documents). All data sources were given equal weighting and used to corroborate one another. Where contradictory information was found in different data sources, data corroborated by the majority of sources was taken as the more accurate. Contradictory information

that could not be corroborated by another source was left out of the final analysis and report.

9 SUMMARY AND CONCLUSIONS

The present study has focused on EE programmes in the context of the formal school curriculum in Zimbabwe and Scotland. It has paid particular attention to the individual and summative impacts of these EE programmes and the macro- and micro-contexts within which these impacts are determined. This chapter revisits the research questions and summarises the findings presented in this thesis in answer to those questions. Under the heading *Looking Forward*, I also suggest areas of further research.

CONTEXTUAL FACTORS RELATED TO THE IMPACTS OF ENVIRONMENTAL EDUCATION

Environmental education is a global project that is guided by international agreements and conventions. The problems it seeks to remedy involve the Global Commons (comprising the Atmosphere, Hydrosphere, Lithosphere and Biosphere) which we all share. Both Zimbabwe and Scotland (through the UK) are signatories of the Rio Declaration (2002) and have ratified common international agreements, including The Convention to Combat Desertification, The Convention of Biological Biodiversity and the Climate Change Convention. In both countries it is such international agreements that are shaping policy and in both countries policy is a strong factor guiding the provision of EE. It often overrides personal and local values by its recontextualisation in the education system through syllabi, curriculum guidelines, rules and regulations. This is in agreement with proposals by Bernstein (1986) (see p.32).

The purpose of EE and ESD in Scotland is to:

Equip people with skills, knowledge and understanding to help them to take better informed decisions, whether corporately on behalf of others or individually in their own lives and to act in ways that are consistent with a sustainable future.

(Scottish Office, 1999)

Environmental education in Zimbabwe aims, among other things, 'to facilitate the development of knowledge, skills, attitudes and values requisite for environmentally sustainable behaviour' (MoET, 2004, p.7).

There is thus a fundamental similarity of purpose on the subject within the school sector in the two countries that justifies their comparison. These countries however represent very different environmental, social, economic and political situations, which, rather than problematising the comparison and contrast of practice, makes for a rich study of how context shapes the impact of this global project.

Contextual factors found in the present study to shape the projected and real impact of EE programmes in these two countries may be divided into *education policy, national culture and status, school management and practice* as well as *teacher attitudes*.

Education Policy

Although policy is a strong factor guiding the provision of EE in both Zimbabwe and Scotland it has served to legitimise EE programmes that had already started. Through recontextualisation as curriculum guidelines and syllabuses, policy has served to encourage more concerted and widespread practices that initially were the initiatives of VOs working together with stakeholders. Policy functions as a pivot around which stakeholders can rally and plan the provision of EE.

The successful implementation of EE programmes requires an adequate resource base. The inadequate resource base for EE in Zimbabwe, as evidenced by the two case study schools, translates to insufficient information and resources for EE programmes within schools. This curtails the success of EE initiatives, limiting their impact and consequently their uptake by other schools and the community. For example, Community Nutrition Gardens that struggle or come to a halt discourage others from starting similar projects. The impact theories of EE programmes, which have been verified by member checking, for the two case study schools of Zimbabwe are impressive in the extent to which they develop predictors of responsible

environmental behaviour and in some cases guide pupils through practicing the same. Needless to say the realisation of these is dependent on the successful implementation of the programmes. The present study indicates that too much responsibility for this is being left to resource poor schools and to voluntary organisations for whom these programmes are not consistently their primary concern, and further, that the funding base for EE in Zimbabwe is inadequate (see p.228).

There is some consensus among stakeholders however that the government has shown a commitment to EE, the latest evidence being its support for the process and establishment as law of the country's new EE policy. There is also funding available for government ministries such as the Department of Natural Resources, who have a mandate that includes EE:

I think the government is committed. As witnessed by the huge amount of resources earmarked for EE. For example, every year we receive a budget for EE material production, a budget for hosting provincial workshops and a budget for the printing of the Natural Resources Bulletin (DNR Representative, personal communication, 16 August, 2004).

Further there is some very limited funding available to fund the activities of VOs in EE (see p.208). A study of partnerships in operation in the field (see p.199), however, reveals evidence from the new Environmental Education Policy and Strategies that no significant amount of money has been made available from the fiscals in Zimbabwe to support EE partnerships. The implication is that use should be made of resources already available within and between various sectors (see MoTE, 2004, p.3 for a list of these sectors). This begs two questions, (1) are there indeed sufficient resources in consenting partner organisations? (2) what are the possibilities of these organisations working together effectively to produce a resource base sufficient for the requirements of effective EE in *all* schools in Zimbabwe? My observations at individual schools, confirmed also by statements from authoritative stakeholders show that the resource base for EE in Zimbabwe is inadequate:

Because we have situations where you have an organisation coming. They excite you so much you want to participate. In the end there is no funding. For example, we had a programme for youth. We were assured that the programme would, among other things, be involved in the operations of vegetable gardens, operations of orchards, propagation of shrubs. But when it

came to the operational ability of the programme it was not realistic. They had promised us that there would buy seeds, they would buy insecticides, they would buy our schools wheelbarrows, watering cans, and so on. When we said where are these things? There was not a wheelbarrow, not a watering can.

(Deputy Provincial Education Director, Province C, personal communication, August 31, 2004)

The current formulation of EE partnerships in Zimbabwe is inadequate to meet this challenge. The findings indicate that there are insufficient resources in consenting partner organisations. Statements by authoritative stakeholders legitimise concerns about the extent to which funding made available to ENGOS actually finds its way to pupils, e.g., “The same people (in ENGOS) end up being the beneficiaries, not the targets of the programme” (Deputy Provincial Education Director, Province C, personal communication, August 31, 2004), most likely referring to the fact that management of these programmes consumes most of the funding. Staff benefits related to running programme activities, such as *per diems* and mileage claims are expensive. Such benefits of participation begin among partner VO staff and extend to a lesser extent, to staff from participating schools. The culture of staff receiving additional benefits for attending programme functions, such as meetings and workshops, erodes the sustainability of programmes in an environment where funding is difficult to source and is of a limited duration. High-level senior officials of the MoESC have bemoaned this practice and urge the development and practice of altruistic participation at all levels. This is well illustrated in the following quotation:

(...) well one other thing (...) you see in all the activities we have been doing the organisation (partner VO) does pay for people their roles and their time – some form of allowances. When I first worked with them, I said to myself this is not very good, because people will no longer want to do things selflessly. They will expect money. They will always expect money. Even if it is a good programme if it doesn't pay people will not be interested. Here it seems (...) the committees which are there are very happy to be called for a meeting because they know they will be paid their fares. Fares, those must be paid, but then their allowances, overnight allowances and so forth, sometimes I look at it as a disadvantage. I am saying so because before money was such a problem, we used to have so many programmes and one really did it for professional reasons rather than, ‘I am going to get something out of it’.

(Deputy Provincial Education Director, Province A, personal communication, September 10, 2004)

There is an adequate resource base for those EE activities that are taking place in Scottish schools. This is clear from a study of the linear logic models of individual EE programmes in the two case study schools (see Appendix VI). A glance at the

Resources/Inputs and the *Problems the programme is facing* rows in these tables reveals resource provision for individual EE programmes and shows that at no time did a school cite the shortage of required resources as a limiting factor. However the method of funding reinforces the peripheral nature of EE in the mainstream curriculum. As outlined on p.111 the context of EE in Scotland is one where the Scottish Central Government (through its statutory bodies) and directly, LAs, schools and VOs come together in complex partnerships that ensure a resource base that allows for EE programmes to run relatively sustainably. Zimbabwe and Scotland are similar in that the government has not put much, if any, money behind the implementation of EE in the formal curriculum. This stems from the fact that in both countries there is no intention for EE and ESD to be stand-alone subjects, but rather they are to be integrated into existing subjects, permeating the whole curriculum. Unlike Zimbabwe however, in Scotland there is money available to government agencies and VOs to support partnerships, which are the EE implementation strategy of both governments. In Zimbabwe funding of EE programmes is from outside the country through donor agencies. Local support for EE is mostly in kind.

Information sharing *across* different programmes enriches individual EE programmes, improving their chances of success and hence their impact. The Zimbabwe Environmental Management Act of 2002 emphasises that EE, environmental awareness and the sharing of knowledge and experiences must be promoted in order to address environmental issues and to engender values, attitude, skills and behaviour consistent with sustainable development. For the two case study schools of Zimbabwe forums for the sharing of knowledge and experiences take the form of Permaculture Open Days and CAMPFIRE Science Exhibitions. In general however there is evidence that there is a need of such sharing of knowledge and experiences across different programmes. Environmental NGOs running these and other EE programmes in schools need to work in closer information sharing partnerships as evidenced by some of the findings of this study. The problems of water and pests that dog EE programmes at Mahuwe Primary have been solved at St Margaret's. But Mahuwe does not have access to this knowledge. The fact that the schools are some 400 km apart means that they are unlikely to meet at common

information sharing fora due to the distance. However, the offices of the ENGOs running them are both located in Harare, the capital city. My study found evidence that partnerships between ENGOs are very limited and fraught with problems of profile and competition for donor funding and limelight. This greatly limits the 'comfort zone' for collaboration between these organisations for the benefit of the target population – the schools, and pupils in them – and through them their communities. In general despite a fair amount collaborative activity between ENGOs, MoESC, Government Agencies, Donor Agencies and the private sector (as outlined earlier in the analysis of the Zimbabwean national context) the resource base for EE in Zimbabwean schools is extremely poor and wholly inadequate.

National culture and status

The primary contextualising influence is the place of these two countries within the world-economy which Fien (1992) divided into four groupings; the core industrial nations of the 'first world'¹⁰, the 'peripheral third world'¹¹, countries, the 'semi-peripheral countries', and the 'state-capitalist planned economies' of the former Eastern Bloc. Scotland as part of the United Kingdom belongs to the core industrial nations of the 'first world'. Zimbabwe is a developing country in the 'third world'. The place of these two countries in the hierarchy of countries within the world economy impacts on the values that guide their EE programmes. Scotland along with other first world countries has access to a lot of resources and the social and economic structure of the communities is such that there is less of a need, compared to the third world scenario, for schools to take on responsibilities regarding the

¹⁰ First World refers to nations that were within the Western European and United State's sphere of influence – e.g. the NATO countries, and some of the former British Colonies such as Australia, New Zealand, and South Africa (Wikipedia, 2006). "Westernised, industrialized, non-communist countries" used to apply to all these countries, but in view of the emergence of Japan, China and Russia as economic powers, "industrialised" remains the only valid criterion for 'First World Country' (TeachMeFinance.com, 2006).

¹¹ Third World refers to countries who tried to organise themselves into the Non-aligned movement during the Cold War. They are mostly developing countries, and many of them are located in Africa, Latin America, and Asia. However, the term is frequently used to denote nations with a low UN Human Development Index, independent of their political status. In academia, the more politically correct term to use is "developing nation" (Wikipedia, 2006).

children's welfare and that of the school and surrounding community. In first world countries the school, the individual learners and the communities are provided with more support from the state than the rural areas of a developing country like Zimbabwe. The greater availability of economic and social services in a country like Scotland cushions the inhabitants from the reality and impact of a western lifestyle that fosters hyper- and ecologically-destructive consumerism.

This 'distance' from the reality of environmental impact is evident from a lot of the type of activities pupils are engaged in: e.g., learning tasks based on the study of invertebrate animals, growing apple trees, growing willow for basket weaving, making hay from wildflower meadow, recycling, and imagining a world 50 years in the future. While these are important learning activities, except for recycling and maybe growing apple trees, most of these activities are divorced from the reality of pupils' everyday life. In advocating realistic learning activities Higgins (1996) argues that a lifestyle within which one is isolated from the consequences of one's actions is unnatural and in the long run unsustainable.

In Zimbabwe the socio-economic conditions of the rural schools that were sampled mean that pupils are closely associated with food production, caring for sick adults and younger siblings, fuel and water harvesting. As a consequence the impact of environmental problems due to natural causes as well as environmental mismanagement affects them daily. Consequently the values guiding EE programmes in Zimbabwe emphasise pupil involvement in a way that acknowledges the currency of these concerns to them at present as well as in the future. In some cases schools use EE activities to address problems within the school and the learners' lives that mirror those the communities are facing (see p.238 and p.276). Hence the two guiding values:

It is important to involve pupils in projects involving conservation of natural resources, as they are the future custodians of these natural resources (Provincial Chairman for Mashonaland Central Province Opening remarks during The Third Mash Central CAMPFIRE Co-ordination Meeting/Planning workshop. Mazoe Chibhanguza Hotel, 1999).

The education system should extend to the community for it to be successful and useful. As long as any school programme is not benefiting the local communities but remains within the four walls of the classroom, then its efforts come to nought. Education to be useful must

transform the lives of the people around the school (*Regional Director for Mash. Central Region. Official opening of the 6-10 January 1997 CAMPFIRE Science Exhibition Workshop for Teachers*).

This value-driven thrust in Zimbabwe's rural schools to make schools satellites of new knowledge results in the school moving from being an island within the surrounding community, to its contextualisation in the same as it becomes a shared space and community resource centre. In Scotland such a drive exists in the idea of community schools as exemplified in the present study by Currie High. The study of the activities of the Animal Lovers Club and Conservation Currie shows that to the extent that community outreach involves learners, it is a powerful tool in developing ownership and empowerment of learners.

Effective EE for young people in Scotland is as important as that of young people in Zimbabwe. As part of the affluent core-industrial countries of the first world, Scotland is part of a group of countries that are leading a consumer ethic resulting in over-exploitation of resources and severe pollution and waste-disposal problems. Effective EE of the population of these countries is critically important for the welfare of the world's environment, now and in the future. Thus the thrust for educating for future decision-making by Scotland is a pertinent one. The problem arises in as far as the emphasis on the future affects the effectiveness of such education.

In contrast, the ecological, economic and social context of rural Zimbabwe means that schools and pupils in them are faced with harsh weather conditions and other environmental problems, poverty, orphaned learners, early drop-out from school, etc. In these circumstances young people, take on citizenship responsibilities in a way that their contemporaries in Scotland are protected from. Schools often find it necessary to intervene for the purpose of keeping individual pupils productively in school amid difficult personal circumstances. This takes the form of training in practical survival skills, supplementary feeding programmes, provision of medicine and tuition fees. In situations of meagre external resource provision from government and other sources, schools and their communities are learning, through EE, that the environment is the greatest resource they have, and well-managed can be a source of

sustainable livelihoods. Environmental education programme managers acknowledge the active citizenship of learners even at primary school age, and involve learners in EE activities that place an emphasis on the pressing socio-ecological and economic problems they are facing, offering relevant practical education. Thus pupils are regarded as citizens today as well as future custodians of community and natural resources. This is illustrated by a statement by one of the teachers:

And we have established that garden actually as an intervention to mitigate against the adverse effects of HIV/AIDS. We are saying some of the children there have been orphaned, some of them are actually heading families. The mother passed away, the father passed away, and they are actually heading families. They are taking care of their brothers and sisters (TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004).

My study indicates that Zimbabwe's EE programmes accord with Knamiller's (1983) call for school-based programmes that would help children analyse the structure and activities of their own lives, that improve their decision-making and community participation skills, while at the same time fitting into the academic examination framework of present day schools. Knamiller predicted, rightly, that the demand for education leading to academic certification was not likely to wane and the most profitable way EE could be pursued in developing countries was to link children's out-of-school experience and local development issues with school learning. Zimbabwe's EE programmes attempt to involve learners in processes of participation, gathering and reporting information and considering alternatives for social action. All of which processes are integrated into the ongoing academic syllabus.

School Management and Practice

The analysis of barriers to EE presented on pp.117-118 shows the challenges that EE presents to schools. These challenges are i) *organisational*, having to do with an education system resource inundated with many agendas and initiatives (DIA, 2002), having a limited time, within a curriculum which, especially at secondary school level, tends to be discipline-based, emphasising abstract theoretical problems; ii) *educational*, having to do with teachers' perception of their own qualification and expertise; iii) *logistical*, having to do with a perceived lack of resources and funding,

and iv) *conceptual*, having to do with a consensus about the scope and content of EE. While i) and ii) are common to both Zimbabwe and Scotland, resources and funding were not found to be an issue in Scotland. In Zimbabwe their presence is taken as a challenge and have given birth to an EE strategy that links natural resource conservation with sustainable livelihoods. Conceptual barriers appear to be well addressed in both countries by the use of partnerships as a strategy in the delivery of EE (see p.119 and p.199) and thus were not found to be a constraint to EE.

Whether a school is a primary school or a secondary school is a major factor affecting the effectiveness of EE programmes. This fact is highlighted by the Scottish case studies where the 5-14 school curriculum spans the primary and secondary schools. At Inveraray Primary School EE activities take a whole-school approach. The integrated nature of the curriculum in primary schools allows aspects of the whole curriculum to be taught out-of-doors and the school prides itself on being able to teach the whole curriculum using the outdoors. This possibility however stops in S1 and S2. These two stages, while remaining part of the 5-14 curriculum are located in the secondary school. One secondary school factor found to impinge on the impact of EE activities is the voluntary nature of most EE activities. Only activities that are integrated into one of the school subjects are mandatory for pupils to participate in.

The presence or absence of an action context is an important factor that affects the impact of EE. The present study used intensity sampling among informed stakeholders to select examples of 'best practice'. It is worthy of note that in the case of Zimbabwe the schools mentioned most often among stakeholders and therefore selected as examples of 'good practice' are both located in the rural areas. As the researcher I was puzzled by this, wondering why this was the case. A possible explanation came to light when the findings for Zimbabwe and Scotland were contrasted. I propose that the reason rural schools are outstanding in EE performance is that, unlike most suburban and urban schools in Zimbabwe, and unlike both rural and urban schools in Scotland (as exemplified by Inveraray, which is classified as rural [Headteacher, Inveraray Primary School, personal communication, April 27,

2004], and Currie High, an urban school), they have an action context for EE. As Ogunyemi (2005) proposes, EE and ESD calls for new processes of instruction, oriented towards action for sustainability. The principles of sustainability require immediate application to reinforce, extend and demonstrate gains.

In Scotland the emphasis on pupil participation in school grounds development is an idealistic one, where the purpose is to develop pro-environmental knowledge, attitudes and values that will affect future decision-making. This idealistic perspective deals with learners within schools as citizens-in-waiting, not present-day citizens. Environmental education programmes targeting such futuristic objectives struggle to find an action context that resonates with learners' daily lives. The result is few opportunities for decision-making and practice in environmental citizenship. Such opportunities have been found during the national survey and case studies of EE in Scotland to be available mainly on the subject of recycling. The general lack of a meaningful action context lessens the impact of EE at this level. Table 8.2, Figure 5.1 and

Figure 5.2 show that limited impact is due to a lack of opportunities to develop an in-depth knowledge about issues, personal investment in these issues, personal commitment to their resolution, knowledge and skill in using environmental action strategies, internal locus of control and intention to act. A person with an "internal locus of control" expects that he/she will experience success or somehow be reinforced for doing something. A person with an "external locus of control", on the other hand, does not believe that he/she will be reinforced for doing something and, therefore, will probably not do it (Hungerford & Volk, 1990, p.12).

Zimbabwe's programmes in the rural context display an instrumental stance to EE which is used as a means to an end, stressing *purpose* and *product* (Sterling, 2001, p. 26). Although there is no national policy foundation for it, there is some *ruralisation* of the school curriculum in schools located in rural schools. This has been within the flexible extra-curricular time that extends from 2pm to 4pm Monday to Thursday in primary schools in these areas. The primary school day ends around noon during

weekdays. Urban primary schools use the afternoons to carry out club activities (e.g. Scripture Union, Traditional Dancing, Scouts and Brownies, etc.) as well as sports. Rural schools normally use this time to carry out production activities. Production activities may include growing vegetables, raising chickens and rabbits, all for sale to raise income for the school. In the past, and no doubt in some schools today, such activities are considered as extra-curricular and rarely integrated into the academic syllabus (Knamiller, 1983). It is in this extra-curricular activities time that most EE teaching and learning activities in the two case-study schools in Zimbabwe take place. The present study revealed that the extent to which these activities are integrated into the core-curriculum varies from school to school.

The effectiveness of EE programmes in schools requires a holistic approach. For example St Margaret's Primary School seems to be more successful than Mahuwe Primary School in terms of the level of environmental citizenship outcomes their EE programme engenders. Whilst in both schools there is evidence of the development of *Entry-level*, *Ownership* and *Empowerment level* variables involved in environmental citizenship behaviour, Mahuwe Primary School takes pupils and staff to a lesser extent than St Margaret's in practicing good environmental citizenship. There is a holism and interconnectedness in the activities happening in the different parts of St Margaret's Primary School that no doubt stems in part from the fact that the school is running a single EE programme, and in part from the nature of that EE programme. This is not the case at Mahuwe where islands of good practice are surrounded by contradictory practices in other parts of the school. (For example, the maintenance of gum tree plantation while the school is simultaneously suffering from crippling water shortages as Mahuwe is a low rainfall area that suffers semi-desert conditions for large parts of the year). This discord is echoed in some of the Community Nutrition Gardens that have sprung up as a result of the school model. The problems that EE programmes encounter because of a lack of holistic approaches mitigate against successful implementation and hence the impact of EE activities. Before any additional EE programmes are added to existing ones it makes sense to examine them carefully for congruency with existing programmes and to avoid contradictory practices.

An analysis of the types of outcomes from EE programmes has been done using the Hungeford and Volk (1990) model and displayed in Figures 5.1, 5.2, Tables 8.1, 8.2 and 8.3. These tables and figures chart the development of environmental citizenship behaviour, dividing EE programme outcomes into *entry-level*, *ownership* and *empowerment* predictors of environmental citizenship behaviour. At this stage I will highlight similarities and difference in terms of *actual* and *intended* outcomes of EE in the two contexts. In both countries the impact theories of EE programmes within case study schools show the development of actual teaching and learning outcomes within the school's control. These constitute the bulk, if not all, actual outcomes in the Scottish case study schools. Other outcomes within the schools' control in the Scottish case studies that were identified are intended, and have to do with social benefits to learners in the form of personal fulfilment from being able to make a difference, increased self-esteem presumed to lead to greater ability to resist peer pressure, etc (see Figure 5.5). They are categorised as intended because their categorical identification from empirical data was beyond the scope of the present study. In addition to actual teaching and learning outcomes within the school's control, Zimbabwean case study schools display actual other outcomes within the school's control that have to do with learner's health and vocational benefits as well as benefits to the school and the teachers (see for example Figures 7.4 and 7.5). Further the Zimbabwean case study schools display occasional actual outputs outside the school's control (see for example Figures 7.1 and 7.3). These are a result of the community outreach thrust of EE that views schools as satellites for new and relevant knowledge. The absence of such a community outreach thrust in the two Scottish cases that involves learners accounts for why no such EE outcomes were identified for the Scottish case study schools.

Teacher Attitudes

In both countries the presence of one or more enthusiastic teachers and/or headteacher at the school is an important factor influencing effective implementation of EE programmes. Despite all the rhetoric EE remains marginalised in the mainstream school curriculum. An SNH representative interviewed in this research stated that the enthusiasm of the headteacher at Inveraray Primary School was key to

the selection of Inveraray Primary School as a demonstration site for SNH's school grounds development programme in Argyll and Bute. In all four schools there is evidence that the presence of enthusiastic personnel or the employment by the school of dedicated personnel (as in the case of Currie High) is important to the successful implementation of EE. Published literature explains why enthusiastic personnel are important to the success of EE. There is often a gap between national policy and practice in the classrooms and so the presence of EE in a country's education policy is no assurance of *how* it is taught in the nation's classrooms, if indeed it is taught at all. Although Kenya has had EE in the education policy since 1988 (Taylor, 1998), Ho (1998) found that only 63% of Kenyan teachers often delivered EE in their general classroom. Bekalo and Bangay (2002) found a mismatch between the intentions of the official curriculum and that delivered in the classroom in Ethiopia, with recommended experiential learning sacrificed in favour of exam success. The peripheral nature of EE in the present-day school curriculum stems from its infusion into established high status subject areas such as Science, Mathematics and Geography. This means that it is easy for teachers to get by without undue emphasis on the environmental message, effectively muting EE's potential as a transformative educational discourse (Gruenewald, 2004). Enthusiastic teachers who have 'bought into' the cause of EE, are a potential antidote to the disciplining influence of the mainstream discourse of education, and the present study has found that they are key to distinguishing the presence or absence of good EE practice in a school.

In general the present study found that once organisational, educational and perceived logistical barriers have been overcome to a certain extent and EE projects are begun, their benefits woo teachers into increasing enthusiasm. There are professional, personal and social development benefits to the teachers as they travel, participate in workshops, competitions, peer educate other teachers, etc. (see also p.162). In Zimbabwe, besides providing a valuable teaching and learning resource in rural situations of serious school resources poverty, teachers have the satisfaction of seeing previously starving children attain better nutritional status, and the consequent benefits in overall performance of various school activities. Depending on what the school ground developments are, EE projects provide teachers with access to food,

medicine, poles and protection against the elements. Although not specifically studied, there is anecdotal evidence in the Zimbabwean context that active participation in EE programmes often leads to financial remuneration in travel allowances and *per diems*, promotion within the Ministry of Education, or the securing of lucrative jobs with partner ENGOs. This area was not specifically studied during the present research and no anecdotal or other evidence for such additional teacher benefits emerged for the Scottish context. A teaching post in Scotland carries higher remuneration compared to the majority of posts in the voluntary sector. Practical benefits to teachers in Scotland include making teaching and learning better. Councils in some cases guide schools in doing things that help them 'tick' several boxes at once (see p.123). Improved learner behaviour, meeting the needs of different learning styles and student integration into the school community are additional instrumental functions that EE has served in the school context.

To conclude, in both countries EE programmes generate positive teacher attitudes, with Zimbabwe to a greater extent than Scotland providing important personal benefits to the teachers.

THE NATURE OF ENVIRONMENTAL EDUCATION: THE SCOTTISH CASE STUDY

The portrait of EE in Scotland offered by Smyth (1999), while revealing the broad trends and status of the subject, does not provide detail of how policy translates into practice. The present study sought in part to provide such a portrait through empirical evidence gathered during a national survey and in-depth case study of two schools. This section summarises these findings under the four guiding themes: *policy*, *partnerships*, *programmes* and *values or underlying principles*.

Policy

Scotland's response to the national call to environmental attention was the publication *Learning for Life: a National Strategy for Environmental Education in Scotland* (Scottish Office, 1993) by the Working Group on Environmental Education set up in 1990 by the then Secretary of State for Scotland. As a follow-up to this in June 1995 the Scottish Office published *A Scottish Strategy for Environmental*

Education. In this publication the Secretary of State for Scotland commends *Learning for Life* to all seeking a guide as to his policy on environmental education, expressing explicitly his intention to adopt it as the basis for a Scottish strategy for environmental education. Indeed many sectors in Scotland have based their own policies on environmental education on the publication *Learning for Life*. More recently Scotland has restated its commitment in the publication *Choosing our future: Scotland's Sustainable Development Strategy* (Scottish Executive, 2005a), which is a response to *Securing our future: The UK Sustainable Development Strategy* (Great Britain Department for Environment, Food and Rural Affairs, 2005).

Partnerships

In reality the Scottish government has not committed any significant amount of money to EE, recommending from the outset the use of partnerships to maximise the use of available resources. Partnerships used in the pursuit of EE go a long way in addressing the theory-practice gap that plagues EE in schools. The availability of some state funding allows for the existence of various partner organisations that come together in complex ways for the provision of EE in schools.

Programmes

Environmental education in Scotland is relatively eclectic as evidenced by the range of programmes running throughout the country (see Table 4.1). There are programmes that operate at a national scale, i.e. Eco Schools, and some school ground development programmes. There is also a lot of local contextualisation in the form of EE programmes tailored for the geographical location of the school, e.g. 'Farm Links', and 'Clyde in the classroom'. Schools select EE programmes partly based on the criterion that they should improve teaching and learning. There is a general agreement that EE programmes should be based on the school curriculum. They should stimulate and enrich learners' experiences, encouraging an interest in the environment (see p.120).

Depending on the LA and the school EE may be formulated as a whole school approach (e.g. Inveraray Primary School), or as part of Citizenship Education,

Enterprise Education, and/or Health Education. A pilot project at Currie Community High School is experimenting with the idea of a dedicated ESD course at S1 level through the SSSP. Evidence from practice in the case-study schools shows that in individual schools provision of EE becomes 'patchwork', with new programmes being added on to existing ones according to basic criteria (summarised in the last three paragraphs). An example is at Inveraray Primary School where, at the time of this research, the school grounds were the basis of most EE teaching and learning in the school. To this had been added, in true patchwork fashion, a competition and a pilot programme, among other initiatives.

Funding for EE programmes in Scotland comes from a diverse mixture of sources as outlined on p.128. In general schools source funding for their programmes from anywhere they can. A school's ability and willingness to make the commitment these programmes require depends a lot on individual teachers and the headteacher's willingness to be involved.

Whilst Inveraray Primary School has no community outreach thrust to its EE programmes Currie High, as a result of its 'community school' status has a very deliberate community EE outreach programme. Evening EE Community Classes that are in the programme no doubt reflect the school's own vibrant EE programme.

The benefits of EE programmes

An analysis of the summative impact of EE programmes as exemplified by the two case study schools shows that good practice in EE programmes running in schools within Scotland develops predominantly *Entry-level* and *Ownership* variables involved in responsible environmental citizenship behaviour – according to the Hungerford and Volk (1990) model.

There is evidence pointing to the success of the 'issue basis' of EE programmes in developing environmental sensitivity, knowledge of ecology and desirable attitudes and values. In general, however, in Scotland environmental action and related skills development is limited by the lack of a meaningful action context to practice and demonstrate the gains from EE teaching and learning. One topic that seems to allow

this is recycling. This lends itself to action by learners in schools and at home. The national survey of EE activities reveals that recycling projects are the third most popular EE programmes in Scotland, after Eco Schools and school ground development programmes.

Environmental education is sometimes used in an instrumental way for purposes including improving pupil behaviour at primary school level (see p.162), the development of a work ethic, building self-esteem through mentoring relationships with peers, the successful accomplishment of tasks and learning conservation skills (see p.192). Cognitive development through EE in Scotland as exemplified by these two case studies comes through pupil participation in school ground developments and then a whole school approach (as exemplified by Inveraray Primary School) and school guidance (e.g. a website with recommended materials for use) tempered with individual class teachers' innovative use of the developed sites for teaching and learning of core curriculum concepts (as exemplified by activities at Currie High). Limitations to the use of school grounds development comes at secondary school level when pupil participation in such activities becomes voluntary – as evidenced by the Conservation Currie and the Animal Lovers' Club programmes at Currie High; and is no doubt affected by various other school factors (see p.117). Not many pupils volunteer for these activities. As a consequence, personal, social and affective benefits initiated at primary school (see p.324) are not sustained to the majority of students at S1 and S2 level.

In contrast to Zimbabwe in Scotland environmental education is not related in any way to nutritional or vocational benefits. Rather, school success in EE 'markets' the school, opening up avenues of general school improvement through additional school activities and sponsorship (see p.162 and p.193).

Values or underlying principles guiding EE

The drivers of EE programmes in Scotland's schools, based on evidence from the national survey and the two case study schools, include (in no particular order) the presence of guiding policy at national and LA level; the enthusiasm of the head and

individual teachers; environmental organisation initiated projects and competitions; as a teaching resource for teaching a variety of curriculum concepts; school values that include a desire to minimise the impact of the school by replacing lost habitats, a desire to promote understanding of the need to preserve the environment for the future, and to improve pupil behaviour (through outdoor activities) while meeting the needs of different types of learners

Environmental education and ESD in Scotland is based on the belief that pupils can only be taught to care for the environment initially through enjoyable outdoor experiences. This is well illustrated by statements from authoritative stakeholders (see p.122). Further, EE and ESD is organised with a view of students in schools as citizens-in-waiting, who require training for future decision-making and to put the right political pressure as an electorate (see p.122).

THE NATURE OF ENVIRONMENTAL EDUCATION: THE ZIMBABWEAN CASE STUDY

A study of the portrait of EE in Zimbabwe by Taylor (1998) reveals that while looking at broad trends and the status of EE in Zimbabwe, previous research works have not looked in detail at how policy translates to practice. The national survey of EE in Zimbabwe and the detailed case study of two schools are the basis of the portrait drawn in the present study and summarised in this section under the four guiding themes: *policy, partnerships, programmes and values or underlying principles*.

Policy

The Zimbabwean National Environmental Education Policy and Strategies (MoET) was signed into law in 2004, to the relief of ENGOs and other stakeholders in the country who had, for a number of years, been pushing for a policy to guide EE efforts in the country. The attempt to involve as many stakeholders as possible in its formulation means that the policy incorporates a lot of the type of work that had already been going on in the country. The Zimbabwean government has not committed any funding for the implementation of this new policy. The policy is

explicit in its assumption that stakeholders will work in partnership to maximally utilise resources that exist.

Partnerships

The present study has described in detail various partnerships formed in the pursuit of EE operating in Zimbabwe (see p.199). There is a lot of enthusiasm among stakeholders, based on the strong, shared vision of protecting the country's natural resources while meeting the needs of the communities. For example:

We don't lobby them (ENGOS). We share a common vision of promoting the sustainable utilisation of natural resources and the vision of limiting environmental degradation (Department of Natural Resources representative, personal communication, 16 August, 2004).

The partnerships formed, however, are dogged by problems of profile and competition for limited donor funding:

You can be used to create a good name for another institution. As long as your partnership is not very clear to the audience there is a danger. You may not be able to come out quite clearly in terms of bringing out to the (audience) your agenda when you join others (Mukuvisi Environment Centre Representative, personal communication, August 31, 2004)

Especially (partnership) with a government department (...) their resources are very limited. You can end up pumping more than them and if you are not very careful they will end up getting the credit (Representative, (WEZ Representative, personal communication, August 26, 2004)

There is also a lack of government funding for VOs and EE partnerships. Individual EE programmes generally have unique funding provisions. All EE programmes are suffering from the current political and economic instability of Zimbabwe. Problems include the impact of the land resettlement programme and subsequent loss of support from foreign donors and commercial farmers. This has led to a scaling down of some EE programmes and a discontinuation of others. Below are some substantiating statements from authoritative stakeholders:

There is a time when there was a lot of pressure, because we had a lot of NGOs who wanted to fund this type of activity and that type of activity and so forth and so forth. Including UNESCO, UNICEF (...) All that has sort of gone down. (Deputy Provincial Education Director, Province A, personal communication, September 10, 2004)

Then we have another one in Fort Rickson. The Fort Rickson Environmental Education programme, FREE. It covers Insiza, and it also used to cover the farms around Shangani area. But we have (also) suspended operations, because we were being funded by farmers there. But when some of their farms were taken for land resettlement they were not very happy about it. So they decided to pull off their support from us (WEZ Representative, personal communication, August 26, 2004).

Programmes

My study investigated and reports only on those programmes currently running. The large surface area of Zimbabwe and relatively large population *vis a vis* the resources of any one environmental organisation means that no programme was found that covers schools in all parts of Zimbabwe. Individual programmes cover those geographical areas limited by their remit, e.g. CAMPFIRE Science Exhibitions are limited to CAMPFIRE areas and WEZ covers some rural areas close to conservation areas. Through the Research and Policy Division of the Ministry of Education head offices central government controls which EE programmes are permitted to run in the country's schools. However the interest of schools and individual teachers and headteachers is critical for successful uptake of programmes by schools. Indeed schools through their headteachers have ultimate decision-making power as to what programmes the school involves itself in.

The national survey and case studies reveal a great shortage of resources within some schools taking part in voluntary organisations sponsored EE programmes. There is evidence that the extent to which targeted donor funds trickle down to schools and learners is questionable.

Environmental education programmes in the two Zimbabwean schools has been shown to develop *Entry-level*, *Ownership* and *Empowerment* variables that predict environmental citizenship behaviour with some to a greater extent than others facilitating the practice of environmental citizenship behaviour.

Values and underlying principles guiding EE

Environmental education in Zimbabwe is guided collectively by being part of national policy implementation and the need to educate for responsible citizenship, environmental awareness, environmental conservation, and sustainable livelihoods

(see p.232). Its implementation in rural Zimbabwe is driven by geographic, economic and social problems related to natural disasters, a variation of total annual rainfall which is interspaced by periods of drought, deforestation, falling land productivity and the HIV/AIDS pandemic. This, linked with political and economic instability, has had the cumulative effect of deepening poverty among the population. This has given birth to a strategy in Zimbabwe's rural areas that links natural resource conservation with sustainable livelihoods. The present study shows that of necessity Zimbabwe takes an instrumental stance that values education as a means to an end (Sterling, 2001, p. 26). This is similar in Kenya where Ho (1998) reports that this extends to the teaching of practical skills leading to possible self-employment for learners (see p.34). In Zimbabwe EE programmes go beyond vocational training to meeting learners' needs for food, medicine, and tuition fees. In other words through EE programmes schools effect social welfare interventions in individual pupils' lives as the situation dictates. This is done for the express and pragmatic purpose of keeping learners in school amid social and economic conditions that would otherwise dictate their drop-out. This underlying value is in line with the general agreement that without broad quality education the potential of individuals and the nation to overcome socio-ecological and economic problems will be severely restricted.

Uptake of EE programmes is encouraged by acknowledged academic and cognitive benefits of participation in these activities, and the critical shortage of teaching and learning resources. There are academic gains through knowledge and skills overlap between EE projects and core-curriculum areas, or the deliberate use of EE to enhance the teaching and learning of core-curriculum areas.

The values that govern EE in the Zimbabwean context presented in the present study echo the contention by BESO-USAID (1994) and Mehran and Tilak (1997) that EE which places emphasis on pressing socio-ecological and economic problems and offers relevant practical education is essential in overcoming sustainable development challenges.

Rural schools are considered satellites of new knowledge to their surrounding communities, and a deliberate community outreach component strives to ensure that EE programmes receive uptake by the community. The fact that EE programmes are linked to learner's physiological needs, vocational future, the school's needs as well as community needs, combined with the active participation of learners, seduces learners into an appreciation, respect and care for their environment. The school's success in EE activities translates to secondary success in other areas, including improved sporting performance, improved academic performance, and infrastructural improvement to the school.

The current political instability, a highly inflationary shrinking economy, and high unemployment in the formal sector has resulted in a continuing erosion of social services. In this situation social mobility *via* certification through national examinations remains a very important way out for young people. In view of the shrinking formal sector in Zimbabwe it is important, even in the urban and suburban areas, to heed Knamiller's (1983) call that schools concern themselves not only with certification but with local community issues in ways that address viable alternatives to social mobility through the acquisition of formal sector jobs. The training of practical skills and enterprise leading to possible self-employment is one way this may be done, as shown by the case studies presented in this research.

FACTORS AFFECTING THE DEVELOPMENT OF ENVIRONMENTAL CITIZENSHIP BEHAVIOUR

My study used the contrast of Zimbabwe and Scotland to bring a focus on factors that aid and constrain the development of environmental citizenship behaviour in the school context. These were found to be the nature of the issue basis of EE, the role of school ground developments, the role of learners in the development and maintenance of these school ground developments and the role of the school in the community. Below is a summary of the effect each of these has been found to have.

The nature of the issue basis of environmental education

Environmental education in both Zimbabwe and Scotland tends to be issue-based. The difference between the two countries comes from the nature of the issues. In

Scotland the study of invertebrates that are found in the school grounds, recycling, and global issues relating to the political economy of the rich and poor countries, while important for the development of environmental sensitivity, knowledge of ecology and pro-environmental attitudes, does not give much scope for practice in decision-making and social action. The emphasis is on educating future decision-makers, and the development of informed citizens who will make the 'right' decisions as an electorate. Consequently a study of the impact theories shows that EE programmes in Scotland develop predominantly *Entry-level* predictors of environmental citizenship behaviour.

In contrast the issues investigated by EE programmes in Zimbabwe are intrinsically bound to important aspects of the learners' day-to-day lives such as nutrition, protection from disease, and in some cases, their lives. As a result there is scope within the primary school curriculum for pupil investigations that are important to them and their community. There are also opportunities to practice decision-making and take social action. The result, from a study of the projected impact theories of programmes in these two schools, is the development of *Entry-level*, *Ownership*, and *Empowerment* predictors of environmental citizenship behaviour, as well as opportunities to practice environmental citizenship.

The role of school grounds developments

In both Scottish schools, school ground developments have become an integral part of the teaching and learning process. Environmental education and ESD in Scotland is guided by the belief that pupils can only be taught to care for the environment initially through enjoyable outdoor experiences. School ground developments are used only for teaching and learning and play. In the Zimbabwean cases, school ground developments are used for teaching and learning activities, as well as, depending of what they are, a source of food, medicine, poles, protection from the elements, etc. As described earlier, according to Vaske and Kobrin (2001) this results in place-dependence and place-identity whose relationship to environmental citizenship was described earlier (see p.295).

The role of learners in development and maintenance of landscapes

Zimbabwean rural schools in general are very resource poor. There are no support staff at St Margaret's Primary School. Mahuwe's support staff consists of a school secretary only. Consequently of necessity pupils in these schools have to develop and then maintain all school ground features developed in the course of EE activities. In Scotland the flexibility of the primary school (P1 to P7) allows for pupil involvement in decision-making in the course of EE activities. There is no necessity, and pupils are not responsible for the development and maintenance of school ground developments. For S1 and S2 EE programmes secondary school factors mitigate against the involvement of pupils in school grounds developments and maintenance. These include a subject-based, 'overloaded' curriculum, with specialist teachers teaching different subjects during strict time-periods of the school day, and the voluntary nature of EE school grounds developments. Pupil involvement is not strictly necessary as the schools employ sufficient support staff for such developments and their maintenance.

The role of the school in the community

School EE programmes in Zimbabwe seek solutions to problems that affect the learners and the school, as well as being echoed in the community. As a result these programmes often find use in the community. From an examination of the impact theories of the four case-study schools it appears that the greater or more effective the school-as-a-model-to-community link the greater the development of environmental citizenship behaviour.

The findings presented here are not the end of the story. As I have based this research on that of others before me, so too this work serves to throw a light on areas where more work needs to be done to further develop our understanding of environmental education; a central feature of our sustainable future.

RECOMMENDATIONS FOR EDUCATION SYSTEMS IN SCOTLAND AND ZIMBABWE

- There is a notable similarity between the Eco Schools programme (see p.124) running in Scotland and the POEMS programme (see p.253) running in

Zimbabwe. The seven elements of Eco Schools (Keep Scotland Beautiful, 2003, p.7) parallel the stages of POEMS (Makuwerere, 2004, pp.13-17) in the following way:

Eco Schools	POEMS
Eco Committee	EE Working Group
Environmental Review	Audit of school environment resulting in identification of Audit Zones
Eco Code	Draft Policy Statements for each Zone
Action Plan based on Environmental Review	Action Plans for each Zone
Involving the whole school and the community	Teachers and learners divided into Zones, and work in collaboration with members of the community.
Implementation	Implementation
Monitoring action and evaluating progress	Implementation of Action Plans evaluated and periodically reviewed.

During the present study POEMS was a pilot programme running in 24 selected schools across the country. Preparations for the expansion of Eco Schools within the Southern African region, including Zimbabwe, are at an advanced stage (FEE, 2006). The similarity between Eco Schools and POEMS may in part be due to the involvement of the author (C. H. Makuwerere) in on-going groundwork and consultation regarding the introduction of Eco Schools into Zimbabwe, among other countries in the region. All stakeholders in Zimbabwe and in the Southern African region should consider the ground work and precedent set by the POEMS programme, take on board lessons learnt from it and seek to build on it rather than bring Eco Schools as an additional programme in schools where POEMS is already running.

- The national surveys give an overview of national EE policy, the actual policy guiding EE among practitioners, the values guiding the selection and implementation of EE programmes at national level, and the types of programmes taking place throughout the nation, along with the details of their implementation. This, together with the in-depth case studies of two schools, provides a contemporary portrait of EE for each country. Policy makers would

benefit from this information as feedback on the impact of existing legislation, and how policy meets practice at grassroots level. This in turn may reveal to them existing gaps in legislation and/or support needed for existing legislation.

- The portrait of EE in each country may also be used as a foundation for a detailed map of EE provision. This is important for policy makers, VOs and heads of government Education Departments in informing support, planning and funding for present and future EE programmes.
- The present study reveals that policy is a key driver of EE activities, especially in the formal school curriculum. Policy makers should be aware that without political will EE will remain marginalised and under-resourced within the mainstream school curriculum. Political will should ensure adequate legislative guidelines, an enabling political environment, and the provision of state funding. Policy serves to legitimise EE programmes within a formal curriculum that arguably is often ‘overloaded’, providing an anchor around which stakeholders form partnerships and rally together for the provision of adequate resources, some with more success than others.
- The detailed case studies present to PEDs, EOs and VOs a detailed description of ‘good practice’ in the field and it is my hope that these will inform their practice when interacting and working with schools and inform decisions regarding key additional support areas for individual schools. This is especially important for VOs where manpower constraints and time often restrict their access to detailed practice on the ground in individual schools.
- It is clear that VOs in Zimbabwe should make more and better partnerships with each other and other stakeholder groups with a deliberate focus on ensuring a sound, sustainable resource base for EE in all of the country’s schools. The detailed description of the use of partnerships in EE provision as described in each national survey report (Chapter 4 and Chapter 6) is rich with information regarding the strengths and limitations of this as an operational strategy.

Members of the ZWEECF and legislators in higher offices should examine carefully these findings and, I hope, reconsider the extent of the current reliance on partnerships to supply the resources required for EE in all of the country's schools. Voluntary Organisations and government education officials should find the contrast of practice in Scotland and Zimbabwe illuminating with respect to the advantages of complex partnerships among the various stakeholders.

- In the presence of an adequate resource base it is schools whose holistic approach to EE ensures congruency between different activities occurring in the same school that excel. This congruency between different EE activities requires information sharing between organisations running different EE programmes, especially if such programmes run concurrently within some individual schools in the country.
- For EE to be successful head teachers should support the flexible working arrangements that EE development often requires. The enthusiasm and commitment of the headteacher is a key driver for the formation and maintenance of successful partnerships. The enthusiasm of individual teachers is the 'glowing coal that ignites the EE bonfire' throughout the school and the presence of such teachers is directly responsible for good practice.
- Stakeholders should be made aware and understand the full range of possible benefits from EE to promote uptake and continued participation and funding. The present study has shown that school development, the personal development of pupils – including academic, affective, and behavioural benefits, and in the case of Zimbabwe, nutritional and vocational benefits are all linked to successful EE programmes. Furthermore, in those instances when the school has a deliberate community outreach thrust, successful EE programmes lead to social and community development.
- When social, economic and political services cushion a country's inhabitants from the reality of the environmental impact of their lifestyle this perpetuates

idealistic EE teaching and learning activities due to a lack of a meaningful action context. Environmental education requires maximum learner engagement in an issue-based, problem-solving approach to important and relevant environmental problems – a situation which provides unique opportunities for practice in decision-making and social action. Such an approach develops citizens who have a sense of ownership of the issues and are empowered to act individually and corporately towards their resolution.

- In the face of this Scotland would do well to take a lesson from EE practice in Zimbabwe and reconsider the current emphasis on educating for future citizenship, which, although valid arguments exist for it, is oriented around and consequently problematised by essentially ‘abstract’ issues.
- Zimbabwe would do well to take a lesson from EE practice in Scotland and reconsider its reliance on external sources of funding for EE programmes. Zimbabwean policy makers and MoE officials should take cognisance of the impact the recent political instability has had on EE programmes and their funding, especially in view of present EE policy that translates to a reality of partnerships that rely on external donor funding. In my view this continued reliance is unsustainable and government has to make an adequate financial commitment to this important curriculum area.
- In both countries partnerships between various stakeholders are a key implementation strategy for EE that has its foundation in national policy. Although such partnerships go a long way in addressing the theory\practice gap that plagues EE in schools (see p.120), as well as presenting other advantages (see p.205), the present study found several problems with this strategy (see p.206). In both countries EE/ESD is seen as cross-curricular, permeating the whole curriculum. While this has the advantage of facilitating holistic experiences, increasing curriculum linking, improving lateral thinking skills as well as not adding to the number of subjects in the curriculum (see p.177), it does not come without cost. EE/ESD infused into high status, established subjects has

resulted in governments in both countries not allocating specific funding for it in the formal school curriculum in the same way it does for stand alone subjects. It is clear that if both governments would like to support EE/ESD they should put additional resources into schools for its implementation.

LOOKING FORWARD

In both Scotland and Zimbabwe stakeholders bemoan the limitations placed on EE implementation by the structure of the secondary school curriculum, arguing that talents developed in pupils during primary school are often not further developed in secondary school. If their argument has substance it is important that research be carried out into ways in which primary and secondary schools can collaborate to ensure a continuation of the development of environmental knowledge, skills, attitudes and values throughout secondary school.

In the Zimbabwean case, purposive sampling for this research resulted in the selection of two case study schools, both located in the rural areas. To determine urban-rural factors that affect EE policy implementation it is important that research be carried out that compares implementation of EE in urban and rural schools.

According to Rossi et al. (1999), to determine the soundness of programme theory it must not only be described well but also be evaluated carefully. The reasonable estimations of causality that are represented by programme theories yield important insights, providing propositions on how the mechanisms introduced by a programme into pre-existing contexts can generate outcomes. My study describes programme theory for EE programmes in the four case study schools. They represent with reasonable accuracy a description of responding practitioners' implicit theory of action and throw light into those areas of the programme on which useful evaluative research could be done. Such evaluation of key outcome areas would establish the mechanism and extent of the impacts indicated in the impact theory. At this evaluation stage specific output themes could be tracked in a larger sample size of schools in each country. This will give a more generalisable picture of EE outcomes nationally.

Despite nearly 30 years of concern at individual, institutional and global level, the rate at which the natural environment suffers degradation keeps on accelerating in nearly all spheres (Heyd, 2003). A decade ago scientists argued that we were pushing the Earth, our only home, to the very limit of its capacity (Park, 1997, p. 10). In more recent times Professor James Lovelock, creator of the Gaia hypothesis, has suggested that the world may already have passed the point of no return for climate change, and civilisation, as we know it, is now unlikely to survive (McCarthy, 2006). While the problem appears to be largely physical the causes and solutions lie much more in people's attitudes, values and expectations. There are too many people (the UN predicts a world population of 8,200 million by 2025) expecting too much from the world's resources (Pickering & Owen, 1994, p.4). But how can a change in attitudes, values and expectations come about? Ruckelshaus (1989) (in Pickering and Owen, 1994, p. 440) suggests that change is a three-phase process. First, world leaders need to transmit environmental values to both the public and the private sectors. Second, motivation is needed to initiate and drive those changes, and finally institutions are needed that can translate the agreed policies into action. Formal education institutions form what UNESCO (1997) calls 'humanity's best hope and most effective means in the quest to achieve sustainable development' (p.16).

The present study found strong indications that EE in primary and secondary schools continues to be dogged by problems of limited resources, and continues to struggle to find a sustainable niche in the discourse of mainstream formal education.

Nevertheless there are valiant efforts taking place at grassroots level to implement national EE policies, which, if given the necessary support coupled with reflective, evidence based practice at all levels, should go some way to meeting global expectations.

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APPENDICES

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APPENDIX I

RESEARCH PROTOCOLS

PRELIMINARY FIELDWORK QUESTIONNAIRE

Open-ended questions including:

1. What programmes do you (or your organisation) run that have an EE component?
2. Do you have any links with schools?
3. If yes, how does your programme interface with the schools?
4. What funding structures exist to support your programme?

Thank you very much for your time.

LOCAL EDUCATION AUTHORITY
ENVIRONMENTAL EDUCATION QUESTIONNAIRE

This questionnaire is part of a survey being carried out in all provinces in Zimbabwe. It is part of PhD research work on Environmental Education. The results of the survey will be useful in identifying schools in each province whose practice best reflects the province’s policy on environmental education. Could you please return the completed questionnaire according to the instructions provided below by **20 August, 2004**.

1. Who is responsible for the implementation of environmental education in primary schools in your Province?

Name:
Post:
2. Would you, or the person in charge of environmental education in primary schools (if different) be willing to be interviewed?

I would be willing Yes [] No []
My colleague.....would be willing Yes [] No []
3. How would you describe your province?

Rural [] Urban [] Other[] *Tick all appropriate categories*
4. How many schools are in your province?

Primary [] Secondary [] Special []
5. Could you please explain your province’s policy on environmental education in primary schools.
.....
.....
.....
.....

Do you have documents you would like to share? Yes [] No []

6. What environmental education activities are taking place in your province?
.....
.....
.....
.....
.....

Please continue on a separate sheet if necessary.

Additional sheet attached Yes [] No []

7. Which schools do you feel represent best practice in reflecting your province's policy on environmental education?
Give as many names as you wish.

Primary Schools
.....
.....
.....
.....
.....
.....
.....
.....

8. Please give the names of schools in your province that have more than one environmental education programme running.

.....
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.....
.....
.....
.....
.....
.....

9. What outside organisations are involved in helping deliver environmental education in your schools?

.....
.....
.....
.....
.....
.....

10. Is your province's environmental education policy driven by the national policy?

Yes [] No []

If **Yes**, which aspects of national policy inform this process?

.....

.....

.....

.....

.....

Is there a Local Agenda 21 officer in post responsible for your province?

Yes [] No []

If **Yes**, can you please provide his/her contact details below.

.....

.....

.....

.....

.....

.....

Thank you for your time.

Please return the completed questionnaires by fax to c/o **Steiner Maposah** Fax
Number **(04) 727299** OR **(04) 72729928** by **August 20, 2004.**

Alternatively please post the responses to:

Myra Kandemiri
Department of Science and Mathematics
Education
The University of Zimbabwe
P. O. Box MP167
Mt Pleasant
Harare

Provincial/Local Education Authority Structured Follow-up Questionnaire

Instructions: Bullet points represent information that I am looking for in the respondent's response to the general question (numbered).

Introduction

As a follow-up to the first survey to which you kindly responded, I would like to ask a few questions relating to four specific themes in environmental education. These are *Policy*, *Programmes*, *Partnerships* and *Values*.

POLICY

1. I am interested in the policy framework of Environmental Education (EE) in the Primary School Curriculum.

In terms of EE and EE policy, what is your relationship with Central Government?

1. *Communication*
 2. *Funding*
 3. *training*
 4. *decision-making*
2. In terms of EE and EE policy, what is your relationship with your schools?

UNDERLYING PRINCIPLES

3. How did you select which programmes run in your schools?
 - Who was involved in the decision-making process
 - Did they have existent EE values or was it purely post related?
4. What fundamental beliefs or values guide the provision of EE in your LEA?
5. What personal values guide your own work in EE?

PROGRAMMES

6. In your response to my survey questionnaire you mention a number of EE activities that are taking place here. How are these activities funded/resourced?
7. Are all your primary schools running the same EE programmes?
 - Please explain any variations that exist.

8. Are the programmes in the primary schools reflected in the Secondary Schools at all?
9. How willing, and able, are schools to make the commitment in terms of time and other resources that EE programmes demand?
 - How does the need to meet attainment targets, determined by nationally set levels affect the willingness to participate by schools and the practicality of EE activities?
 - What are the other initiatives besides EE initiatives currently going on in your schools?
 - Do you think there is an overload of initiatives in the schools?
10. What evidence base informs your programmes and practice

(Reference here is made to any published research literature, evaluations of similar programmes, your own past experiences, shared experiences of other professionals running similar programmes, training, workshops, etc.) *(do you have any documents you could share regarding this?)*

PARTNERSHIPS

11. Who are your partners in EE provision?
 - Brief history of partnerships and
 - who initiated them
12. Do you have a policy on partnerships (to guide the formation of collaborative relationships).
13. How do your partnerships work (their nature and character)?
 - Stable membership, restricted, highly interdependent?
 - Fluid in membership, limited interdependency and influence?
 - Scope for initiative and autonomy among partners?
 - Strong shared vision?
 - Common bond or the belief that brings the partners together?
 - Extent of devolution of decision-making between the partners?
14. What are your LEA's experiences of collaborative partnerships in EE?
 - Concerns
 - Advantages
 - Disadvantages
15. Does Central Government have a role in your partnerships?
 - Is Central Government carrying its fair share of the load?

- Are partnerships a cope-out mechanism?
- Funding, Is funding ring-fenced?

16. Would you please give me contact details for your contact person in each of your partnership organisations?

Thank you very much for your time.

VOLUNTARY ORGANISATIONS

ENVIRONMENTAL EDUCATION STRUCTURED QUESTIONNAIRE

POLICY

1. What, if any, is the policy framework of your activities in environmental education (*Could you provide or give references to published documents relating to this?*)
2. What do you see as the government's commitment (role) in EE?
3. Do you feel that the government is fulfilling this role?

PARTNERSHIPS

4. Who are your partners in EE provision?
 - Brief history of partnerships and
 - who initiated them
5. Do you have a policy on partnerships (to guide the formation of collaborative relationships).
6. How do your partnerships work (their nature and character)?
 - Stable membership, restricted, highly interdependent?
 - Fluid in membership, limited interdependency and influence?
 - Scope for initiative and autonomy among partners?
 - Strong shared vision?
 - What is the common bond or the belief that brings the partners together?
 - Extent of devolution of decision-making between the partners?
7. Are there imperatives to partnership working (e.g., ring-fencing of funds whose access require evidence of partnership working).
8. Is there a need to encourage collaborative working?
 - If so do you have a strategy in place to encourage collaborative working?
9. What are your Organisation's experiences of collaborative partnerships in EE?
 - Concerns
 - Advantages/Benefits
 - Disadvantages

10. Does Government have a role in your partnerships?

- Is Government carrying its fair share of the load?
- Are partnerships a cop-out mechanism?
- Funding, is funding ring-fenced?

11. Would you please give me contact details for your contact person in each of your partnership organisations?

PROGRAMMES

12. What EE programmes are you involved in?

- Names of programmes, and activities related to EE
- The target population for each of the programmes
- The geography of the operation of the various programmes

13. What are the sources of your funding for these programmes?

14. What theory or evidence base informs your programmes and practice

- (Reference here is made to any published research literature, evaluations of similar programmes, your own past experiences, shared experiences of other professionals running similar programmes, training, workshops, etc.) *(do you have any documents you could share regarding this?)*

VALUES

15. What values guide EE provision in your organisation?

16. What personal values guide your own work in EE?

SAMPLING

17. Which schools represent best practice in EE in the primary schools?

18. Which key contact people do you think would inform this study well?

Thank you for your time.



Moray House School of Education
The University of Edinburgh
St Leonard's Land
Holyrood Road
Edinburgh EH8 8AQ

Date: 19 July 2004

Mr Mbirimi
Policy Research Development
18th Floor Ambassador House

Dear Sir

Re: Application to consult Ministry of Education officers and teachers during research in Environmental Education in the formal school curriculum in Zimbabwe.

I am a PhD student at the University of Edinburgh Moray House school of Education. My research is on the subject of Environmental Education, looking specifically at the formal education sector in Zimbabwe. The research gives special emphasis on Environmental Education in the Primary School curriculum.

The first phase of the research examines national policy on Environmental Education. A national survey follows. This involves consultation with local education authorities in Zimbabwe's 10 Regions. The national survey will reveal schools that exemplify 'best practice' in the implementation of national policy. Two schools will be selected as case studies. In each of these two schools the researcher will carry out interviews and classroom observations during a period not exceeding one week in September 2004.

I write to request permission from your department to consult Ministry of Education officers and teachers on the subject in Zimbabwe's 10 Regions as may be necessary during the course of the research.

Thank you.

Yours sincerely,

Myra B. Kandemiri (Mrs)
Tel: 091 943 035
04 572309



Moray House School of Education
The University of Edinburgh
St Leonard's Land
Holyrood Road
Edinburgh EH8 8AQ

Fax: +131 651 6521
Tel: +131 651 4110

Department of Science and Mathematics Education
The University of Zimbabwe
P. O. Box MP167
Mt Pleasant, Harare

Telefax: 04 572309
Tel: 091 943035

Attention: Mr Chihota
EO Staffing
Mash Central Province
c/o Provisional Governor Headquarters
Harare/Bindura Road
Bindura

September 15, 2004

Re: Environmental Education in your Province.

I am a doctoral student at Moray House School of Education, University of Edinburgh. I work for the university of Zimbabwe as a lecturer in the Department of Science and Mathematics Education. Please find attached a questionnaire on environmental education. This questionnaire is being sent to all provinces in Zimbabwe and is part of PhD research work on environmental education in Zimbabwe's primary school curriculum. Could you please forward this questionnaire to the officer in charge of primary school environmental education in your province?

Please fax the responses **c/o Mr Steiner Maposah** fax numbers **(04) 727299** or **(04) 72729928**.

Please find attached a copy of the letter of permission to carry out this research given by the Ministry of Education Policy Research Development unit.

I would like to thank you for your time and cooperation in this very important research.

Regards,

Myra Kandemiri
Enc.

TEACHER QUESTIONNAIRE

Introduction

I am interested in the programmes and activities in your school that are aimed at facilitating environmental education. You have been suggested by the headteacher as a key respondent for one of these programmes. Thank you for taking the time to think through the issues raised in this questionnaire. I would like to request for an hour of your time between 26 April and 30 April, 2004 to go through these issues together. If it is acceptable with you I shall tape record our chat to maximize data capture and the effectiveness of further analysis. If there is an opportunity during this week I would like to observe any sessions you may have planned that illustrate aspects of the programme/activity.

Name of Programme: _____

Section One

Service Utilisation Plan

- 1. Which classes take part in this programme?
- 2. Could you please take me step by step though the process of engaging the pupils with the main environmental education activity events?

PERIOD	Teacher Activity	Pupil Activity
Before		
During		
After		

- 3. In what way does the programme vary among the different primary classes?

Section Two

Personnel Information

4. Could you please list as fully as possible the reason(s) why you teach in this way?
Reason 1

Reason 2

Reason 3

5. What training/qualifications/experience do you have with environmental education/activities.

Qualifications/Training:

Experience:

Section Three

Resources and Prior Functions

6. What facilities and equipment does the programme command? What are your perceptions about the resources of the programme. Are they adequate? (If "No", What more is needed?
7. Who funds the activities of this programme?
8. Whose responsibility is programme supervision?

9. Do you have any special clerical or technical support for the programme?
10. What would you say are your main problems

Section Four

Programme Goals and Objectives

11. Why did this project/programme get developed?
12. What do you think the programme is trying to accomplish in the
13. -Short term
14. -Intermediate term
15. -Long term?
16. How can you tell if these results actually occurred?
17. What changes or differences is participation in this programme making in the pupils?
18. Is the programme having any negative effects, or are there any that you foresee in the future?

19. If any, then What do you could or should be done to avoid these problems?

Section Five
Evaluation

20. Do you have a formal procedure for evaluating the success of this programme?

21. How much informal feedback do you get on the success or progress of programme activities?

22. What is your measure of success in this programme?

Is there anything else you would like to say about this programme?

Thank you for your time.

Document Request Form

Teacher In Charge Environmental Education

1. Could you please complete the Table below which lists Programmes/Projects/Activities running in the school with a distinct environmental education component?

Programme	*Key Contact Person Within the School	**Date available for Interview	**Date available for Lesson/Other Observation	Key Partner's Contact Person (Name and Contact Details)
(Prg 1)				
(Prg 2)				
(Prg 3)				
(Prg 4)				
(Prg 5)				
Prg (6)				
Other				

*Mr Mashaya, could you please give to each key contact staff a copy of the attached Teacher Questionnaire to give some idea of the sort of issues I will raise this week.

** Note: These dates should preferably fall between 20 September 2004 and 24 September 2004. Wherever possible it would be preferable for both an interview and an observation of the activity to be carried out.

St Margaret's Primary School

Please tick against the documents available regarding each programme

Programme	Prg 1	Prg 2	Prg 3	Prg 4	Prg 5	Prg 6
Authorising legislation						
Debates						
Committee reports						
Regulations and guidelines						
Research						
Evaluation						
Audit reports						
Memoranda (e.g. administrative)						
Speeches						
Documents describing the organisation of the programme and staffing						
Grant applications						
Reports from the field						
Publicity brochures						
Press releases						
Journal articles						
Proposals for outside funding						

APPENDIX II

PROGRAMME DOCUMENTS USED TO VERIFY AND COMPLEMENT INTERVIEW INFORMATION

Programme documents on Inveraray Primary School's EE programmes.

Below is a list of documents that were utilised to verify and complement interview information at Inveraray Primary School.

- The headteacher's report on the GfL sponsored Action Research Curriculum Project (Paterson, 2003a),
- Whole school and individual class detailed curriculum outlines,
- GROUNDNOTES – a series of technical advice sheets available on different topics published by GfL and Learning through landscapes'
- The headteacher's speeches as summarised in PowerPoint presentations of them. Policy documents (Paterson et al., 2004),
- SEED Guidance on Flexibility in the Curriculum (Circular 3/2001),
- excerpts of a 5-14 Environmental Studies Guide for Teachers and Managers (author unknown),
- letters and e-mail communication between the headteacher and partner organisations regarding collaborative projects as well as minutes of relevant meetings, 'Learning Outside Inside':
- An Action Research Project Stimulus Event programme of activities, worksheets and Inveraray Primary's programme planning documents for this action research project,
- GfL 'Learning Outside Inside' Curriculum Documentation on Opportunities for Learning From and In the Wider Environment (First Stage Briefing),
- The Group for Recycling in Argyll and Bute (GRAB) Trust newsletters and worksheets,
- Education for Technological Ability: Our School Grounds (The Nuffield Foundation and Teaching and Learning Scotland),

- Inveraray Primary School Grounds Project Plans of Work for 2001/2002, and for 2002/2003,
- Eco Schools Scotland Handbook (Keep Scotland Beautiful, 2003),
- Internet publications on Eco Schools,
- Eco Schools Newsletter,
- Inveraray Primary School's Eco School Award: Application for Green Flag,
- Fliers and information regarding EE training, conferences, and workshops carried out at Inveraray in collaboration with partner organisations,
- Two newspaper press releases and one radio broadcast,
- Inveraray Primary School Staff Handbook,
- School Squeak Newsletters,
- Firing the Imagination, Creating Ideas (GfL, 2002),
- The headteacher's report on The Sky Above The Earth Below Competition (Paterson, 2003b).

Programme documents on Currie Community High School's EE programmes.

Below is a list of documents that were utilised to verify and complement interview information at Currie High.

- Currie Community High School Prospectus,
- Currie Community High School Submission for Eco Schools Green Flag Award (April, 2004),
- PowerPoint presentations of two speeches by the Environmental Projects Coordinator,
- Currie Community High School *Contact* School Magazine (March, 2004, Edition, 18),
- Internet publications on Currie Community High School' accolades,
- Internet publications on Eco Schools at Currie Community High School and the Eco Schools programme in general,
- Currie Community High School Audit of one year plans for Session 2002-2003, 2003-2004,
- Currie Community High School Development Plan for session 2003-2004,

- Unpublished school documents on ESD and environmental projects,
- Her Majesty Inspectors of Schools reports on Standard Inspection of Currie Community High School (1999),
- Document on the construction and use of a Japanese Garden,
- Extract from Teachers in Development Education, DEC (Birmingham) from Learning Today with Tomorrow in Mind (author unknown),
- Currie Community High School' EE website, www.currieecology.org.uk,
- Lost Habitats of the Lothians (Carroll, 1996),
- Unnamed and undated publications on Decorative Tubs, Wildflower Meadow, Flowers and Insects, A Wetland Habitat, A Sensory Garden, Shrubs and Trees in the Triangle,
- Examples of pupil projects on global environmental issues.

Programme documents on St Margaret's Primary School EE programmes.

Below is a list of documents that were utilised to verify and complement interview information at St Margaret's Primary School.

- Internet publications on the Integrated Land Utilisation Design (ILUD) process and Permaculture in Zimbabwe;
- SCOPE Expo Newsletters for July, 2000 (Vol 4, Issue 2), November 2001 (Vol 3, Issue 2), February, 1998 (Vol 1, Issue 1 and Vol 5, Issue 1), November, 2001 (Vol 4, Issue 2);
- Detailed report on the Proceedings of the Sensitisation Workshop for school heads (April, 2002),
- Information sheet on the SCOPE programme (SCOPE Coordinator, n.d);
- An overview of Permaculture (Makovere, n.d);
- School documents on the ILUD process;
- The SCOPE programme 1998 Annual Report; detailed report of the proceedings of the Regional Director meeting on schools Permaculture (August, 1997);
- St Margaret's Primary School Permaculture Implementation and Management report by the then TIC of Permaculture (n.d);

- SCOPE coordinator's speech on a Permaculture Drawing Competition prize giving day (n.d);
- Letters between the school and partner organisations;
- Teachers' invitation to training of trainers Permaculture workshops;
- Headteachers and DEO invitations to Permaculture workshops;
- Termly reports on the SCOPE programme (1999 and 2000) written by the TIC and deputy TIC of Permaculture;
- The Harare Regional Director's Circular Minute Number 10 of 1999 [*The SCOPE Programme School competition on Permaculture Practice (April, 1999)*] – informing schools on the programme and its competitions and encouraging schools to participate;
- Reports on the 1999 SCOPE Green Your School Drawing Competition (October, 2000);
- Application to the National Farming Network for financial aid;
- Letters to the school from members of the community related to the SCOPE programme,
- School assessment of project progress by funding and operating partners, e.g. SCOPE, the MoESC Curriculum Development Unit;
- Conference publication on the SCOPE programme (Nyika, 2001b);
- School documents on the ILUD process,
- Teachers' reports and plans on the operations of individual school EE sites;
- Undated draft for a special feature on The Success Story of St Margaret's School in Permaculture,
- Minutes of school meetings on the SCOPE programme in the school;
- Undated, unnamed article entitled Introduction to Permaculture Design;
- Report on the pilot Permaculture programme by the TIC of Permaculture at the school,
- School reference materials on Water Harvesting and Examples on How Permaculture Works.

Programme documents on Mahuwe Primary School EE programmes.

Below is a list of documents that were utilised to verify and complement interview information at St Margaret's Primary School.

- Internet publications on CAMPFIRE ,ACTION and the POEMS programme, e.g., Murry, Steve (n.d) The ACTION programme: meeting school and community needs. [Internet] Science Series. Available from: http://library.unesco-iiicba.org/English/SECONDARY_SCIENCE_SERIES/science_articles/the_ACTION_programme.htm [Accessed 22 January 2005]
- A Sourcebook in support of the POEMS Project (Makuwere, 2004),
- Enviro-Action Schools Competition flier,
- An application of funding by the TIC of EE projects,
- ACTION Magazine (Issue No. 20),
- Letters of communication between the school and its partners in EE projects,
- Detailed reports on: the proceedings of CAMPFIRE Science Exhibitions, teacher workshops, a Regional Planning Meeting, joint Coordination and Planning Meetings, and Facilitators workshops; (e.g., Mupfuni, S. (1997) *Report on the Ministry of Education Mashonaland Central Campfire Science Exhibition Workshop for Teachers*. Bindura Primary School, 6-10 January, 1997)
- School documents on integrating ES with other subjects,
- School documents detailing the history of the Science Exhibition workshops,
- Undated and unnamed Guest of Honors speech at a Science Exhibition,
- Science Exhibition judging sheets,
- The Guruve District Campfire Science Exhibitions Constitution (2000).

APPENDIX III

INVERARAY PRIMARY SCHOOL LINEAR LOGIC MODELS

Minibeasts Topic Linear Logic Model

Aims	<p>To fulfil the requirements of the 5-14 curriculum: Minibeasts is a suggested topic (Headteacher, Inveraray Primary School, personal communication, April 27, 2004)</p> <p>To utilise the school grounds in support of the ongoing School Grounds Project (L. Kidd, P1/2 classroom teacher, personal communication, April 26, 2004)</p>
Objectives	<p>To broaden pupils' knowledge of and understanding of the world. (L. Kidd, P1/2 classroom teacher, personal communication, April 26, 2004)</p> <p>To teach pupils that certain insects have an important role to play in the world (L. Kidd, P1/2 classroom teacher, personal communication, April 26, 2004)</p>
Resources/ Inputs	<p>A lot of visual stimulus, e.g. picture cards of individual insects, posters, books, videos BBC Science Programme BBC Science Teacher's Manual Minibeasts Topic Box School Library Resource centre at Lochgilphead A visit from ZOO Lab Headteacher and class teacher (L. Kidd, P1/2 classroom teacher, personal communication, April 26, 2004)</p>
Programme Activities*	<p>All the activities are firmly rooted in structured play, and are designed to prepare children for the Scottish 5-14 curriculum. The activities fit into the Pre 5 guidelines issued by the local authorities throughout Scotland (Harpley and Roberts, 2003).</p> <p>Pupils set bug traps to catch various insects in the school grounds; draw insects they see in the grounds; learn the names of various insects; learn variety and distinguishing features of insects; classification of insects; lifecycles of various insects; these insects' interaction with the environment, i.e. feeding relationships and protection of the species.</p> <p>The programme is cross-curricular, with the topic Minibeasts</p>

	(looking at ladybirds, snails, worms, spiders, butterflies and all kinds of insects) inspiring related work in the wider Environmental Studies, Expressive Arts, English and Gaelic, Mathematics, RE/Religious and Moral Education (L. Kidd, P1/2 classroom teacher, personal communication, April 26, 2004)
Target Populations (Participation)* *Activities and Participation together constitute the OUTPUTS	P1/P2 4 to 6 year olds
Problems that programme is facing	The weather (L. Kidd, P1/2 classroom teacher, personal communication, April 26, 2004)
External Factors	The weather

<p>Outcomes</p>	<p>Getting rid of insect phobias</p> <p>Pupils get involved in the skills of investigation, observation, classifying and recording (<i>Data source: Harpley and Roberts, 2003</i>)</p> <p>Awareness of biodiversity and habitat</p> <p>Real experience</p> <p>Making the children think about what is going on in the grounds</p> <p>Give children a chance to identify the creatures they have seen in their own gardens and did not know</p> <p>Giving children a chance to find out about something different from us that needs care and responsibility. This is in contrast with their usual work, which focuses on the child, their home, their school and so on.</p> <p>Pupils learn respect and care for living things and the environment</p> <p>Pupils learn conservation of endangered species at local level</p> <p>Broaden their knowledge and understanding of the world</p> <p>PSD in being able to work together, sharing</p> <p>Cross-curricular coverage encourages lateral thinking?</p> <p>Topics in higher grades in the school build on the topics covered in P1/P2</p> <p>Children retain what they have learnt and interest is sparked in them to actually go on to find out more on their own</p> <p>Pupils take forward the information they got in the short term to look at the big picture, of the wider world and develop respect for the environment</p> <p>(<i>Data source: L. Kidd, P1/2 classroom teacher, personal communication, April 26, 2004</i>))</p>
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Rubbish and Recycling Topic Linear Logic Model

Aims	<p>To study the topic of Rubbish in the school, own homes and the community and take action to identify rights and responsibilities to protect the environment. (L. Leyland, P3 class teacher, personal communication, April 26, 2004)</p>
Objectives	
Resources/ Inputs	<p>Video player equipment Relevant books from within the school and Resource Centre at Lochgilphead run by the Council's Education Department Stationary</p> <p>(Data source: L. Leyland, P3 class teacher, personal communication, April 26, 2004)</p>
Programme Activities*	<p>Walk around the school grounds and do a litter survey Identify types of rubbish and discuss why it is rubbish Sort and classify the rubbish found</p> <p>Discuss Could anything else be done with this rubbish? Where did the litter come from? Who is responsible for the litter? Establish what could be recycled? Use information in data handling activity. Make up posters for information for the rest of the school on the litter. What dangers may come from the litter – wild animals? Watch video programme <i>What is Rubbish?</i></p> <p>Discuss what we can do with our rubbish Establish the various way we can deal with rubbish Categorise the ways to use rubbish Visit by GRAB officer Write report to be added to school newspaper</p> <p>Also may: Discuss what <i>biodegradable</i> is? And carry out rotting experiments of: apple core paper bottle top</p>

	<p>cloth (<i>Data source:</i> Inveraray Primary School 5-14 Environmental Studies: Topic Planner, n.d)</p> <p>Cross-curricular work: Painting pictures of animals that could be harmed by litter, Adding up the litter collected by the class, drawing a graph from it.</p> <p>To evaluate the success of the topic in raising pupils in the whole school about litter another litter pick is arranged at the end of the year. A similar graph to the first will be drawn and the two compared. The P3 pupils then give a talk about their activities and findings about litter in the school to the rest of the school. (<i>Data source:</i> L. Leyland, P3 class teacher, personal communication, April 26, 2004)</p>
<p>Target Populations (Participation)*</p> <p>*Activities and Participation together constitute the OUTPUTS</p>	<p>P3 7 year olds</p>
Problems that programme is facing	<p>The weather (L. Leyland, P3 class teacher, personal communication, April 26, 2004)</p>
External Factors	<p>The weather (L. Leyland, P3 class teacher, personal communication, April 26, 2004)</p>

Outcomes	<p>Children learn better while being active, outside, in the fresh air</p> <p>Pupils learn about litter and recycling</p> <p>Peer education on the problem of litter</p> <p>Change the behaviour of these children when they become adults, so that they tread carefully on the earth. (<i>Data source:</i> L. Leyland, P3 class teacher, personal communication, April 26, 2004)</p> <p>Pupils learn human and physical interactions</p> <p>Children learn about resources and how they are managed</p> <p>Children learn to care for their environment and learn that what they do matters.</p> <p>Learners learn rights & social and environmental responsibilities</p> <p>(<i>Data source:</i> Inveraray Primary School 5-14 Environmental Studies: Topic Planner, n.d)</p>
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Butterflies Topic Logic Model

Aims	<p>To increase use of the school grounds in teaching and learning</p> <p>To meet the requirements of the 5-14 Curriculum Guidelines (<i>Data source:</i> K. Norris, P4/5 class teacher, personal communication, April 29, 2004).</p>
Objectives	<p>Teach pupils factual information about Butterflies</p> <p>Teach pupils respect and care for other living things and the environment</p> <p>Make lessons as practical and fun as possible (<i>Data source:</i> K. Norris, P4/5 class teacher, personal communication, April 29, 2004).</p>
Resources/ Inputs	<p>The school ethos: this is a very environmentally conscious school where teachers are encouraged to use the outdoor environment in their teaching.</p> <p>Adequate resources</p> <p>Butterfly garden - The school is willing to order such additional learning aids at the class teacher's request</p> <p>Internet</p> <p>Headteacher created rolling learning programme for two years. Class teacher implements this programme</p> <p>(<i>Data source:</i> K. Norris, P4/5 class teacher, personal communication, April 29, 2004).</p>
Programme Activities*	<p>Classification</p> <p>Lifecycle of the butterfly</p> <p>Rear and release class butterflies</p> <p>Butterfly habitats; including adaptation and feeding relationships</p> <p><i>Specifically:</i> Pupils will record the characteristics of the 5 main groups of vertebrates, giving examples of each.</p> <p>Homework – choose an animal from one of the above groups and research.</p> <p>Distinguish between moth and butterfly. Children play “butterfly drive: in groups; throwing dice until obtained all pieces. Match name to definition.</p>

	<p>Homework – research a native species of butterfly.</p> <p>Read story by Vivian French, Caterpillar, Catepillar, Egg, Caterpillar, Pupae, Butterfly.</p> <p>Discuss food chains and also destruction of habitats.</p> <p>Link to school garden.</p> <p>(<i>Data source</i>: K. Norris, P4/5 class teacher, personal communication, April 29, 2004).</p>
Problems that programme is facing	<p>Teacher not an expert on Butterflies in Scotland. Teacher has to learn the topic before teaching it.</p> <p>(<i>Data source</i>: K. Norris, P4/5 class teacher, personal communication, April 29, 2004).</p>
Problems the programme is facing	
<p>Target Populations (Participation)*</p> <p>*Activities and Participation together constitute the OUTPUTS</p>	<p>P4/5</p> <p>These are 8, 9 and 10 year olds.</p>
External Factors	

Outcomes	<p>Knowledge and understanding of variety and characteristic features of butterflies, their life cycle, and feeding relationships, as well as protection of species.</p> <p>Learn the skills of Preparing for task, Carrying out task, Reporting and Reviewing on task based on Butterfly topic activities (<i>Data source:</i> Inveraray Primary School 5-14 Environmental Studies: Topic Planner, n.d)</p> <p>Pupils learn in lessons made as practical and fun as possible by the teachers. As a result pupils will remember what they have learnt</p> <p>Seeing things growing is awe inspiring for the pupils and Pupils more motivated to learn, and do so with enthusiasm</p> <p>The butterfly topic inspires a whole range of cross-curricular work, in Art (learn Batik and make little cushions with butterfly designs on them), Language, Creative Writing and Technology (writing and making a book on butterflies), and Maths.</p> <p>Pupils develop from having a factual knowledge of butterflies to considering issues of their conservation, and thinking about the consequences of extinction of local species.</p> <p>Learners care for the environment and know the reasons they should conserve 'our' species of flowers and 'our' species of butterflies.</p> <p>Respect and care for living things and the environment</p> <p>Conservation of endangered species at a local level</p> <p>(<i>Data source:</i> K. Norris, P4/5 class teacher, personal communication, April 29, 2004;).</p>
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Planet.com Topic Linear Logic Model

Aims	To encourage pupils to see themselves as global citizens and think more responsibly about using resources (<i>Data source</i> : Fiona Hamilton, P6/7 class teacher, personal communication, 30 April 2004).
Objectives	<p>Learning about food and farming practices in the rich and the poor countries.</p> <p>Learning about the rich world and the poor world (<i>Data source</i>: Fiona Hamilton, P6/7 class teacher, personal communication, 30 April 2004).</p>
Resources/ Inputs	<p>Internet access – for research into the issues covered under the topic</p> <p>Video player equipment</p> <p>Relevant books from within the school and Resource Centre at Lochgilphead run by the Council's Education Department</p> <p>Fax (located at the Resource Centre)</p> <p>Stationary</p> <p>The Computer Centre located at the Training Centre on the school premises assists with repair of computers and other equipment.</p> <p>There are so many resources the teacher feels confident to teach the issues. If she is not sure of anything, she learns together with the pupils using the available resources.</p> <p>(<i>Data source</i>: Fiona Hamilton, P6/7 class teacher, personal communication, 30 April 2004).</p>
Programme (teaching and learning) Activities*	<p>Play 'It's a small world' game – Global Bingo (activity Sheet 2) <i>Attached</i></p> <p>Diamond Mine activity – (activity sheet 1) <i>Attached</i></p> <p>Discuss group decisions</p> <p>Discuss what real hunger means</p> <p>Watch Planet.com programme 5 (1st half) <i>video</i></p> <p>Discuss 'balanced diet', why it is important, when it is most important, what is likely to be missing from diets of the really hungry.</p>

	<p>Make a list of poor countries. Discuss poor people in rich countries.</p> <p>Play a Trading Game</p> <p>Visit local shops to find food which has travelled furthest.</p> <p>Discuss world poverty and debt.</p> <p>Do a quiz on Fair Share</p> <p>Watch Planet.com programme 7 <i>video</i></p> <p>Write two contrasting diaries – one of a person in a the rich world and a person in the poor world.</p> <p>Devise a piece of drama that illustrates the impact of change on an individual, family or community. The change made for example a new well, improved agricultural methods, simple medical care, or freedom from oppression.</p> <p><i>(Data sources: Inveraray Primary School 5-14 Environmental Studies: Topic Planner, n.d; BBC Channel 4 Television, planet.com Programme 5 and 7)</i></p>
Problems that the programme is facing	<p>The content of the topic requires visiting local shops. These are small. So a class visit requires an appropriate number of adults and only small groups can enter a shop at any one time.</p> <p>Parental permission is required for any out of school visits. This constrains flexibility and results in loss of spontaneity.</p> <p><i>(Data source: Fiona Hamilton, P6/7 class teacher, personal communication, 30 April 2004).</i></p>
<p>Target Populations (Participation)*</p> <p>*Activities and Participation together constitute the OUTPUTS</p>	<p>P6/7</p> <p>9-13 year olds</p>
External Factors	
Intended Short Term	Research skills

Outcomes	Investigative skills
Intended Intermediate Term Outcomes	Learners less self centred in their attitudes generally Learners more considerate towards others Learners more thoughtful of what decisions they make Learners have a heightened awareness of their spending power Learners able to make observations independently, so that if they see an injustice it occurs to them spontaneously and they raise it up as an issue. (<i>Data source:</i> Fiona Hamilton, P6/7 class teacher, personal communication, 30 April 2004).
Intended Long Term Outcomes	Learners develop attitudes of thinking about the wider world. This becomes a natural part of how they consider their part in the world. (<i>Data source:</i> Fiona Hamilton, P6/7 class teacher, personal communication, 30 April 2004).

It's a small world

How many connections do you have with the wider world? Play this game of 'global bingo' and find out.

There are 16 questions. Ask your friends one question each. There are 16 squares on the bingo card. If they answer 'yes', put their name in the matching square. When you have a row – vertical, horizontal or diagonal – you have bingo!

- A** Have you travelled to another country?
- B** Have you sent a letter to another country?
- C** Have you telephoned or emailed another country?
- D** Do you have a relative living in another country?
- E** Have you helped a visitor from another country?
- F** Do you enjoy music from another country?
- G** Are you wearing anything made in another country?
- H** Do you like food from another country?
- I** Can you name a sports star from another country?
- J** Do your family have a car that was made in another country?
- K** Do you have anything at home that was made in another country?
- L** Do you live in a home where the language of another country is spoken?
- M** Have you read a newspaper story about another country?
- N** Have you seen a television programme about another country?
- O** Do you have a television that was made in another country?
- P** Do you have a relative who was born in another country?

A Name <hr/>	B Name <hr/>	C Name <hr/>	D Name <hr/>
Country <hr/>	Country <hr/>	Country <hr/>	Country <hr/>
E Name <hr/>	F Name <hr/>	G Name <hr/>	H Name <hr/>
Country <hr/>	Country <hr/>	Country <hr/>	Country <hr/>
I Name <hr/>	J Name <hr/>	K Name <hr/>	L Name <hr/>
Country <hr/>	Country <hr/>	Country <hr/>	Country <hr/>
M Name <hr/>	N Name <hr/>	O Name <hr/>	P Name <hr/>
Country <hr/>	Country <hr/>	Country <hr/>	Country <hr/>

Diamond nine

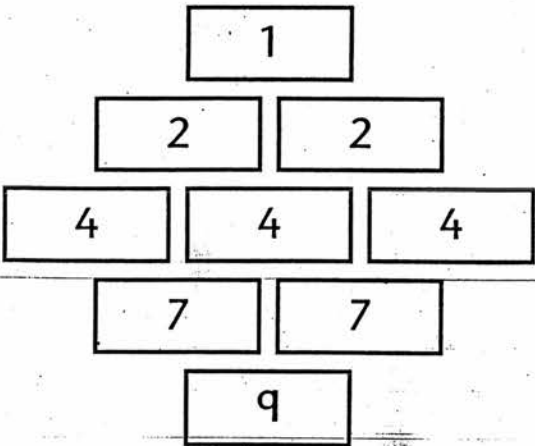
What are the really important issues? This exercise in agreeing priorities demonstrates how difficult it is to decide.

Here are nine statements. Read them, and cut them out.

There are too many people in the world.	We are not growing enough food to go round.	Most people do not have clean drinking water.
The rich countries are too greedy.	We are wasting the world's resources.	We are not using renewable energy enough.
There are too many cars – too few people use public transport.	We are destroying the world's habitats and its plants and animals.	The gap between rich and poor is far too great.

Now discuss them with your friends. Which are the most important; or interesting; or urgent?

Put the cards out in a 'diamond nine' pattern – the most important, interesting or urgent goes at the top, then the next two, then the next three, then the next two, then the last one:



There is no 'right answer'. But you will learn more about what your friends think – and what you think – as you argue for your pattern.

Mathematics in the School Grounds Logic Model

Goals	To audit current curriculum in Maths and create opportunities to deliver skills through the School Grounds project, And then to evaluate the resulting performance in maths (<i>Data source:</i> Headteacher, Inveraray Primary School, personal communication, 27 April 2006)
Objectives	
Resources/ Inputs	<p>Peter Edwards (Educational Consultant, GfL), Joyce Gilbert (GfL) and Fergus Younger (Area officer, SNH – Argyll and Bute) assisted the school after a great deal of discussion to decide to move onto the curricular area of maths (Paterson, 2003a).</p> <p>£400 allocated by GfL for the Action Research project at each participating school (Paterson, 2003a).</p>
Programme Activities*	<p>The first major project to involve maths took place in Feb 2002 when the school was involved in planning and planting the new orchard area (Paterson, 2003a).</p> <p>The trees arrived and were the focus for P3 to use as information handling. There was also opportunity to use as measure. The 10 P3 pupils measured the trees at present and collected the information from the labels as to the varieties, cooking or eating and height expected to be in 10 years. This information was fed into the computer and a spreadsheet was produced (Paterson, 2003a).</p> <p>P3 were working on tables work on the 2,3, 4, 5 and 10 times tables at this period and the 10 apple trees gave excellent stimulus for extending multiplication practice (Paterson, 2003a).</p> <p>The P3 pupils passed the data about apple trees to the P6/7 pupils who then used the information for planning, scale and measurement work (Headteacher and Fiona Hamilton’s lesson notes)</p> <p>P6/7 were involved in designing and making the raised beds and a great deal of measurement occurred with scale and design work (Paterson, 2003a).</p> <p>During the summer term P4/5 were involved in planting the raised beds with corn, barley and wildflowers of which the crops were to be part of the school Harvest Assembly celebration. This involved work in area, measure and volume (Paterson, 2003a)</p>
Target Populations (Participation)*	<p>P1-P7</p> <p>5-14 year olds</p>

*Activities and Participation together constitute the OUTPUTS	
Problems the programme is facing	<p>Staff turn-over</p> <p>(Data source: Headteacher, Inveraray Primary School, personal communication, 27 April 2006)</p>
External Factors	<p>The weather</p> <p>(Paterson, 2003a)</p>
Intended Short Term Outcomes	<p>The pupils learn the following Mathematical skills:</p> <p>Problems solving</p> <p>Investigation</p> <p>Mathematical discussion</p> <p>Algorithmic skills</p> <p>Communicating mathematically</p> <p>Choosing and using the right mathematical instruments</p> <p>Consolidating learning</p> <p>(Paterson, 2003a)</p> <p>Using maths in situations which have more meaning for the pupils makes learning more relevant (GfL and Learning through Landscapes, n.d)</p> <p>Relevant learning is more memorable (GfL and Learning through Landscapes, n.d)</p> <p>Teachers teach better because they are happier outside (Paterson, 2003a)</p> <p>Teachers and pupils produce better quality work (Paterson, 2003a)</p> <p>The use of games in teaching is good for children who learn better through visual – spatial activity</p> <p>(Outside games designed to assist in the learning of certain maths concepts involve learners actively in their learning) (Paterson, 2003a)</p> <p>Greater level of motivation with some boys (Paterson, 2003a)</p> <p>Greater level of motivation with some of the kinaesthetic learners (Paterson, 2003a)</p> <p>Children who struggled with maths indoors were displaying greater levels of understanding when the practical and real element of the maths work could be seen the Grounds Project (Paterson, 2003a)</p>

	<p>Improves the quality of teaching for both children and teachers (Paterson, 2003a)</p> <p>GfL personnel have evidence that difficult to master topics are being mastered by pupils faster in the grounds, i.e., More successful teaching of mathematics concepts (GfL and Learning through Landscapes, n.d).</p> <p>Children quick to complete class based maths indoors after a period of active maths out of doors. Hence this approach is very time efficient (<i>Data source</i>: Headteacher, Inveraray Primary School, personal communication, 27 April 2006)</p> <p>This approach gave opportunities for cooperation between P6/7 and P3 as the older pupils assisted younger pupils to measure and mark out where trees should be planted during orchard development (Paterson, 2003a).</p> <p>Hence teachers are given precious time to stand back and observe (Paterson, 2003a).</p> <p>This way of teaching provides a challenging and rewarding experience for student teachers (Headteacher, Inveraray Primary School, personal communication, 27 April 2006).</p> <p>In many cases the children's behaviour is much better out of doors (Headteacher, Inveraray Primary School, personal communication, 27 April 2006).</p>
Intended Intermediate Term Outcomes	<p>Student teachers leave the school certain to use the outdoors for teaching (Headteacher, Inveraray Primary School, personal communication, 27 April 2006)</p> <p>Learning outside becomes the natural and not forced component of the curriculum Headteacher, Inveraray Primary School, personal communication, 27 April 2006.</p>
Intended Long Term Outcomes	

The Sky Above, the Earth Below Competition (2001-2003)

A creative arts competition for school grounds developed by Grounds for Learning, the School Grounds Charity for Scotland and funded by The Scottish Arts Council National Lottery Fund and The Amerada Hess Corporation.

This competition invited entries from nursery and primary schools throughout Scotland to submit a design for a permanent piece of playground art inspired by their outdoor environment. (*D.S. GfL Publication on the competition*)

APPENDIX IV

CURRIE COMMUNITY HIGH SCHOOL LINEAR LOGIC MODELS

Linear Logic Model for Conservation Currie and School Grounds Development Programme

Aims	<p>The Ecology sites in the school grounds have been developed over the last fifteen years to achieve six aims:</p> <p>To demonstrate and replace habitats lost during the urbanization of the area</p> <p>To maintain and enhance biodiversity in the school grounds</p> <p>To use the habitats created as a teaching resource</p> <p>To promote understanding of the need to preserve the environment for the future</p> <p>To enhance the school and its surroundings and provide an amenity resource for the school and the local community</p> <p>To instill in young people the respect and wonder at the diversity of life around them (Nind, 2004; Walton and Nind, 2000).</p>
Objectives	
Resources/Inputs	<p>City of Edinburgh Education Council Department of Culture and Leisure give advice on management and sometimes fix things</p> <p>The Edinburgh Urban Forest Project coordinated the creation of the new woodland extending Roley’s Wood</p> <p>Conservation currie pupil members</p> <p>Environmental programmes coordinator- Alison</p> <p>Parent and teacher volunteers</p> <p>Duke of Edinburgh pupil volunteers</p> <p>School gardener for general maintenance of formal garden areas in the grounds</p> <p>Technical assistance from the CDT technician and school janitors</p> <p>S6 pupils who have developed a litter picking rota and two pupils every week pick litter from the woods</p> <p>Stationary, photocopying, e-mail, garden equipment, Cameras, etc</p> <p>Funding: Much of the work undertaken in the school grounds is funded by outside agencies and a report on completion is always required. Grants received include:</p> <p>Grounds for awareness</p> <p>Millennium Forest for Scotland Trust</p> <p>Scottish Secondary Schools Partnership (SSSP)</p>

	<p>Community Service Volunteers: 'Valuing Volunteers'</p> <p>Scottish Natural Heritage</p> <p>Scottish Power</p> <p>C.E.C. Local Development Committee</p> <p>Edinburgh Greenbelt Trust</p> <p>C.E.C. Festival for the Environment</p> <p>Whitbread Action Earth</p> <p>(Data sources: Nind, 2004; Environmental Projects Coordinator, personal communication, May 12, 2004; Volunteer, personal communication, May 10, 2004).</p>
Problems the School Grounds programme is experiencing	<p>Even in S1 and S2 the curriculum is very crowded or full and the time that can be spent on EE projects in the school grounds is very limited</p> <p>On-going maintenance is time consuming</p> <p>Litter</p> <p>Dominating plants take over the haymeadow</p> <p>Invasive non native species in the woodland</p> <p>Clogging of the burn with brushwood</p> <p>Replanting of annual and biannual plants</p> <p>Maintaining a genetic mix in the isolated pond in the quadrangle by finding and bringing in spawn from other people's gardens whose ponds are more open</p> <p>Project supervisor is overloaded (luckily a volunteer takes over the administration of most of the grounds conservation work)</p> <p>Vandalism</p> <p>Teasing of pupils volunteers</p> <p>Lack of volunteers</p> <p>(Data sources: Environmental Projects Coordinator, personal communication, May 12, 2004; Volunteer, personal communication, May 10, 2004).</p>
Values	<p>'As a school, we believe that social and economic developments in our time should not jeopardize future generations. This is what we understand by the word <i>sustainability</i>.' (Walton and Nind, 2000).</p>
Programme activities	<p>- Maintenance tasks e.g. Mowing the paths in the Meadow, planting new trees and bulbs, picking litter</p> <p>- Creation of developments in the school grounds</p> <p>- Monitoring of the biodiversity of the ecology sites</p> <p>(Data sources: Environmental Projects Coordinator, personal communication, May 12, 2004; Volunteer, personal communication, May 10, 2004).</p>
Target populations (Participation)*	<p>Open to any pupil who is interested</p> <p>Participants are S1, S2, S4 and Duke of Edinburgh Award pupil volunteers</p>

Activities and participation together constitute OUTPUTS	<p>Parent and teacher volunteers</p> <p>The formal school for teaching and learning</p> <p>Community Groups</p>
External factors	<p>Funding (this was never mentioned as being a constraint on activities). It creates work to get it though (<i>Data source: Environmental Projects Coordinator, personal communication, May 12, 2004</i>).</p>
<p>Intended Short term outcomes</p> <p><i>Outcomes for Conservation Currie are italicized</i></p>	<p>An integrated policy of habitat replacement (Walton and Nind, 2000)</p> <p>School grounds ecology sites used to teach aspects of Science, Art, Geography, ESD, economics, etc (Nind, 2004).</p> <p>In the future willow baskets will be made with willow from willow coppice (Environmental Projects Coordinator, personal communication, May 12, 2004)</p> <p>Pupils' scope and vision widened (Environmental Projects Coordinator , personal communication, May 12, 2004).</p> <p>Pupils get in touch with the living world. This increases their awareness and respect for the living world</p> <p><i>Conservation Currie outcomes:</i> <i>pupils enjoy their involvement with conservation</i></p> <p><i>They develop their interest in living things</i></p> <p><i>Older members nurture the interests of the younger members</i></p> <p><i>It's a social activity</i> <i>(Data sources: Environmental Projects Coordinator, personal communication, May 12, 2004; Volunteer, personal communication, May 10, 2004).</i></p> <p>PSD <i>Personal development of participating pupils/ Increased confidence/Development of a work ethic and Encourages personal responsibility</i> <i>Teamworking</i> <i>Conservation skills</i> <i>Personal fulfillment from being able to make a difference</i> <i>Conservation Currie is a comfort zone to those who are not well integrated and helps their integration into the school</i></p>

	<p><i>Teasing of participants</i></p> <p><i>Participants emerge stronger</i></p> <p><i>Or</i></p> <p><i>Participants are put off</i></p> <p><i>School ecology sites are preserved and so remain in use by the rest of the school to teach various aspects of the curriculum</i></p> <p>School grounds look better and Pupils' awareness of environmental issues raised</p> <p>Community classes of little children use the school grounds</p> <p>A school grounds plan is embedded in the school's future plans</p> <p>School wins awards and competitions and financial support</p> <p>The woodland is a right of way and is enjoyed for its amenity value by the local community</p> <p>(Data sources: Nind, 2004; Environmental Projects Coordinator , personal communication, May 12, 2004; Volunteer, personal communication, May 10, 2004).</p>
Intended Intermediate term outcomes	<p>School grounds bring happiness to school pupils and staff as well as visitors from all over the world</p> <p>School grounds are a resource for teaching and learning to school staff and pupils and visitors from all over the world</p> <p>School wins awards and competitions and financial support</p> <p>School reputation of excellence in EE brings opportunities such as piloting the SSSP project</p> <p>CPD for teaching staff delivered: the school does CPD on How to develop your school grounds for Edinburgh City Council. Also training offered to Higher National Diploma students from Oatridge College for students on Conservation and EE Management courses</p>

	(<i>Data sources</i> : Nind, 2004; Environmental Projects Coordinator, personal communication, May 12, 2004; Volunteer, personal communication, May 10, 2004).
Intended Long term outcomes	The school ecology sites a permanent feature of the school grounds and the curriculum (<i>Data sources</i> : Environmental Projects Coordinator, personal communication, May 12, 2004).

School Grounds Development and Conservation Currie resources and prior functions

The programme requires and has the support of the school administration. There is a part-time Environmental and Sustainable Development Education Coordinator especially employed to oversee the development of the school grounds ecology sites and environmental education in the school. This coordinator also works the other part-time at Balerno Community High School, located in the next suburb from Currie. She is helped greatly by the presence of a volunteer, in the carrying out of the school grounds development and maintenance work.

The group, Conservation Currie, maintains the school ecology sites and carries out some development work on these sites. The school gardener does general maintenance of formal garden areas in the school. The school grounds programme commands sponsorship from several sources that are listed in the programme’s linear logic model above. Funding is not in the list of this programme’s problems but applying for funding is an on-going pressure; so is completing the required evaluation reports. The school has won several awards, and accolades for its school grounds development work, and environmental education among other things. It has been selected for a number of pilot projects because of its perceived excellence. This

no doubt motivates the schools and the programme administration to keep it up, not to mention bringing in resources for the continuance of the programme.

Currie High ESD Course and SSSP Project Linear Logic Model

Aims	<p>The SSSP project: aims To develop new strategies for teaching and learning in the curriculum, making ESD an integral part of school activity To identify future support needs to enable schools to achieve ESD To ensure project is effectively documented and made accessible to a wide audience To enhance partnerships in the delivery of ESD and encourage consensus on what it means in theory and in practice (Data source: Nind, PowerPoint presentation on the SSSP, n.d)</p> <p>The SSSP project plan at Currie High: aims To raise awareness of the need for change in society to protect the environment for the future and the significant contribution that each individual can make To provide the pupils and staff with the opportunity to research and take action on the sustainability issues in their own school and their own lives To improve the health of the school community To improve the school environment (Data source: Nind, PowerPoint presentation on the SSSP, n.d)</p> <p>The ESD project at Currie High: aims Promote health and well-being in the school community Increase pupils understanding of sustainable development issues Foster integrated thinking processes (Data source: Nind, PowerPoint presentation on the SSSP, n.d)</p> <p>The ESD course at Currie High: aims To lead pupils to an understanding of the concept of sustainability To encourage pupils to investigate and integrate information from different sources so fostering the processes of linked thought To encourage and provide opportunity for pupils to take practical action towards preservation of the environment for the future Deliver core skills 'Working with others' and 'IT'</p>
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	(Data source: Nind, PowerPoint presentation on the SSSP, n.d, Nind, ESD course outline, unpublished school document, 2003)
Objectives	
Resources/Inputs	<p>A time from the 15% flexible curricular time</p> <p>Heritage Lottery Funding from which a specific amount of money is given by the partnership to each participating school</p> <p>Specific time and ‘in kind’ commitments by each of the nine partner organisations</p> <p>A coordinator who used to go around the schools assisting them</p> <p>SSSP consultant worked with the school to design the ESD course</p> <p>The Librarian</p> <p>ESD school subject budget</p> <p>A core group of three staff: IT teacher, librarian, project coordinator working with one of Geography, Science, or Art teacher (4 teachers/class)</p> <p>Volunteer – Roley Walton</p> <p>Computers</p> <p>Scanner</p> <p>School photocopier</p> <p>The internet</p> <p>Digital Brain (The Local Education Authority is paying for this external server as part of the ‘Flexible Learning’ pilot programme)</p> <p>(Data sources: (Nind, ESD course outline, unpublished school document, 24 June 2003; Nind, PowerPoint presentation on the SSSP, n.d; Nind, 2004; Environmental Projects Coordinator , personal communication, May 12, 2004; Volunteer, personal communication, May 10, 2004)</p>
Problems the programme is experiencing	<p>The ESD course is too advanced for S1. The concepts are too difficult to grasp for children at this age. At this stage pupils lack the necessary background knowledge to ask the next logical question</p> <p>The course is too wide (big) especially when it comes to the futures work</p> <p>The type of information pupils get on the internet is not accessible to them at this age</p> <p>Pupils have problems getting information for the “50 years in the future” aspect of their project</p>

	<p>Pupils do not like reading books</p> <p>Besides the three core staff, the other teachers help teach this course on a rotational basis and volunteer to do so. They have no specialist training in the subject. In fact only the Environmental Projects coordinator has specialist training in the subject. (<i>Data sources:</i> Environmental Projects Coordinator , personal communication, May 12, 2004; Volunteer, personal communication, May 10, 2004)</p>
Values	
Programme activities	<p>Class activities: Classes of 30 will be divided into three groups. Each group will work as a team and study two topics out of six offered. The emphasis is on the processes of investigation and the understanding of man's impact on the environment rather than on a comprehensive knowledge of any given topic, but there will be a sound body of information for pupils to assimilate</p> <p>The groups will create: a selection of web pages on their chosen topics which will be assembled into one website representing the collective work of all the classes (<i>Data source:</i> Alison Nind, ESD course outline, unpublished school document, 24 June 2003).</p> <p>Dissemination to the Community: Website and open evening/display at parents' evening</p> <p>Consultancy: project coordinator worked with consultant to develop course activities and materials to create a generic course which could be adapted for use in other schools. The course has a core content with optional variations which will be appropriate for staff teaching the course. CPD elements were built in. (<i>Data source:</i> Alison Nind, ESD course outline, unpublished school document, 24 June 2003).</p>
Target populations (Participation)*	Secondary Schools in general beginning with S1 and S2 pupils at Currie High School
Activities and participation together constitute OUTPUTS	Teachers
External factors	
Intended Short term outcomes	Participation in SSSP project has resulted in the school extending and diversifying its environmental education

	<p>programme (Nind, 2004)</p> <p>Pupils understand the idea that man's ecological footprint is currently too heavy/ the concept of sustainability And the necessity of a change in attitude and behaviour (Environmental Projects Coordinator, personal communication, May 12, 2004)</p> <p>Potentially reaching an audience of 700 people through 180 pupils in S1 (i.e. through pupil to family members transmission) (Environmental Projects Coordinator, personal communication, May 12, 2004)</p> <p>Interested organisations learn how to help schools with education (Environmental Projects Coordinator, personal communication, May 12, 2004)</p> <p>Pupils develop critical thinking skills Pupils develop lateral thinking skills Pupils develop the 'Core skill' of Working with Others Pupils develop the 'Core skill' of IT (Environmental Projects Coordinator, personal communication, May 12, 2004)</p> <p>Pupils increased knowledge of Healthy Lifestyle (Nind, 2004)</p> <p>Pupils more aware of issues of litter and waste management (Volunteer, personal communication, May 10, 2004)</p> <p>Pupils more aware of energy issues (Environmental Projects Coordinator, personal communication, May 12, 2004)</p> <p>Pupils's concerns raised and then they are given an opportunity to begin making a difference by participating in the school's work in the school grounds (Volunteer, personal communication, May 10, 2004)</p> <p>Pupils more willing to help out in the school grounds (Environmental Projects Coordinator, personal communication, May 12, 2004)</p> <p>School is a model for pupils and the community (Nind, 2004)</p> <p>Pupils' web pages (Environmental Projects Coordinator, personal communication, May 12, 2004)</p>
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	<p>(<i>Data sources:</i> Nind, PowerPoint presentation on the SSSP, n.d; Nind, 2004; Environmental Projects Coordinator, personal communication, May 12, 2004; Volunteer, personal communication, May 10, 2004; headteacher, Currie High, personal communication, May 7, 2004).</p>
Intended Intermediate term outcomes	<p>Pupils sponsor a pupil</p> <p>Through a link with partner school in Kenya Pupils look at practical demonstrations of sustainability</p> <p>Pupils leave school with a stronger environmental awareness</p> <p>(<i>Data sources:</i> Nind, 2004; Environmental Projects Coordinator , personal communication, May 12, 2004; Volunteer, personal communication, May 10, 2004)</p>
Intended Long term outcomes	<p>Pupils make a difference (Environmental Projects Coordinator, personal communication, May 12, 2004)</p>

Currie High School Animal Lovers' Club Linear Logic Model

Aims	To raise awareness of animal welfare issues at home and abroad (TIC Animal Lovers Club, Currie High, personal communication, 13 May 2004)
Objectives	
Resources/Inputs	<p>Teacher in charge, Funding occasionally from W.S.P.A. Also from fashion show and silent auction SSPCA education officer comes to speak to the club free of charge Other staff in the school are helpful if need be Minibus for trips out of school TV/Video Photocopier Accommodation when fundraising, e.g., school hall (<i>Data source:</i> TIC Animal Lovers Club, Currie High, personal communication, 13 May 2004)</p>
Problems the programme is experiencing	<p>Time. Any trips must be arranged for out of school hours, e.g. Wednesday afternoon or Saturday, so not everyone can attend (<i>Data source:</i> TIC Animal Lovers Club, Currie High, personal communication, 13 May 2004)</p>
Values	Education is the best way of developing knowledge of animal treatment and welfare worldwide.
Programme activities	<p>Lunch time activities: Quizzes, competitions (with small prizes), videos, visiting speakers, TIC brings her pets in, reading SSPCA magazines and literature from IFAW, WSPA, respect for animals, Animal Aid and WWF. The group also sometimes just have a giggle over comical animal pictures and stories.</p> <p>Fundraising for Animal Welfare Organisations. This has included: Sponsored walks, Cake and candy sales, Fashion show, Silent auction Jumble sales</p> <p>Whole school activities: -Christmas donations of pet food and bedding from staff and pupils for the local SSPCA rescue center. -Collection of used stamps and printer cartridges. These are sold to collectors and recycled respectively, to raise</p>

	<p>money for charity.</p> <p>-World Society for the Protection of Animals (W.S.P.A.) Pyramid collecting boxes for small change</p> <p>Social Activities Visit cinema to see animal related films, e.g. finding Nemo.</p> <p>Museum Exhibition, e.g. ‘Cats, the ultimate predators’</p> <p>Visit to “Deep Sea World”</p> <p>Zoo</p> <p>Gorgie city farm</p> <p>Annual Christmas trip to local SSPCA with pet food and bedding donations from the school</p> <p>(<i>Data source:</i> TIC Animal Lovers Club, Currie High, personal communication, 13 May 2004)</p>
Target populations (Participation)*	<p>The whole school</p> <p>Animal welfare groups</p>
Activities and participation together constitute OUTPUTS	<p>(<i>Data source:</i> TIC Animal Lovers Club, Currie High, personal communication, 13 May 2004)</p>
External factors	
Intended Short term outcomes	<p>Pupils more aware of animal issues at home and abroad</p> <p>Pupils learn to fundraise for charity</p> <p>Pupils learn the responsibility of being a pet owner</p> <p>Learn to enjoy the fun part of animals</p> <p>(<i>Data source:</i> TIC Animal Lovers Club, Currie High, personal communication, 13 May 2004)</p>
Intended Intermediate term outcomes	
Intended Long term outcomes	<p>Adults who are knowledgeable in matters relating to animal welfare at home and abroad and who know what shouldn’t be happening</p> <p>Adults who can educate others</p> <p>Adults who know that they can make a difference and the</p>

	different way they can do this
	Adults who may join one of the Animal welfare groups
	(Data source: TIC Animal Lovers Club, Currie High, personal communication, 13 May 2004)

Currie High School Animal Lovers’ Club resources and prior functions

The club’s resources are mostly obtained free of charge from animal welfare organisations. The teacher in charge works on a purely voluntary basis. The club uses the school minibus for out or school trips. The school provides accommodation for pupils’ fundraising activities and all other teachers are helpful if need be. The club uses some of the money from its fundraising activities to fund its own activities but also occasionally receives funding from W.S.P.A.

APPENDIX V

MAHUWE PRIMARY SCHOOL LINEAR LOGIC MODELS

CAMPFIRE Science Exhibitions Linear Logic Model

<p>Aims</p>	<p>To create awareness and the appreciation of a well managed environment among rural communities</p> <p>To encourage rural communities to adopt sustainable use and management of natural resources in their environment (Murry, n.d).</p> <p>To improve their capacity to manage these natural resources while at the same time improving their quality of life (Mr Makonyere, representative of the Zimbabwe Trust, in Mupfumi, 1997).</p> <p>To contextualise science education around community needs together with associated changing balance in favour of process rather than product (Murry, n.d).</p> <p>To promote creativity among learners, exposing them to scientific skills in a way that prepares them to become future discoverers and inventors</p> <p>To address local problems through a problem solving approach (Murry, n.d).</p>
<p>Objectives</p>	<p><i>Pupils and exhibitors will:</i></p> <p>Be aware of their local environment</p> <p>Use and care for the resources in their local environment</p> <p>Identify local community problems and solve them using local materials and resources</p> <p>Develop creative and innovative ability</p> <p>Appreciate other people’s culture through study of different projects in different categories</p> <p>Develop scientific skills</p> <p>Link learning to life</p> <p>Identify and seek solutions to the problems emanating from the environment by designing simple technological devices</p> <p>Investigate ways of recycling resources</p> <p>Take effective action towards management of natural resources</p> <p>Make pupils aware of their environment through collections</p> <p>Analyse local situations and problems and ask questions of why they are as they are (investigations)</p> <p>Find solutions for local problems in the form of design and technology</p> <p><i>Teachers, teacher trainers, and judges will</i></p>

	<p>be professionally trained in problem solving and science process skills related to Collections, Investigations and Design, Recipe and Technology</p> <p>Action will over-see the establishment of democratically elected cluster and district committees</p> <p>provide these members with training in administration and financial management, in order that the capacity for sustaining the programme is built at a local level (Science News).</p> <p><i>(Data sources: Murry, n.d, Mupfuni, 1997)</i></p>
Resources/inputs	<p>Funding from National Lottery Charities Board (NLCB), CIDA, ACTION, USAid, Zimbabwe Trust</p> <p>Logistical support from District Offices</p> <p>Workshop facilitators (come in from other Provinces that have been running the programme)</p> <p>Facilitators from other regions</p> <p>District, Province and National Workshop organised by other ACTION, BEST and the Forestry Commission</p> <p>School teachers and Pupils time</p> <p>School Administration</p> <p><i>(Data sources: Mupfuni, 1997; Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004; various programme documents)</i></p>
Programme activities	<p>Science Exhibitions, an annual event. Schools compete first at cluster, then district, provincial and finally inter-provincial level. Schools taking places one and two are the ones that proceed to the next stage at all stages.</p> <p>Facilitators training workshops sponsored by ACTION</p> <p>Provincial CAMPFIRE Science Co-ordination Meetings</p> <p>Awareness workshops</p> <p>District CAMPFIRE Science Facilitators Workshops</p> <p>Environmental Education In-service Courses for Primary Teachers. Workshops for these take place at District, Province and National level are organised by Action, BEST and the Forestry Commission</p> <p>Fundraising activities</p> <p>Pupils in participating schools do projects in any of the following categories: Collections, Design, Recipe and Technology, Investigation</p>

	Teachers facilitate and guide pupils in doing their projects (<i>Data sources</i> : Mupfuni, 1997; Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004; Headteacher and Deputy Headteacher Mahuwe Primary School, personal communication, September 29, 2004; Various programme documents)
Target populations	Primary school pupils Primary school teachers Communities surrounding these primary schools Secondary schools surrounding these primary schools
Problems the programme is facing	Teachers over guiding pupils with the result that lack ownership of the project Subjective judging of competitions Inadequate marketing (<i>Data source</i> : Mupfumi, 1997) Inadequate funding (<i>Data source</i> : Observation, and various interviews with Mahuwe Primary School staff)
External factors	Funding The whether, especially rainfall Stray animals Staff transfers (<i>Data source</i> : Various interviews with Headteacher, Deputy Headteachers and TIC of EE Projects at Mahuwe Primary School, 28-30 September, 2004)
Values	It is important to involve school pupils in schools as they are the future custodians of these natural resources The education system should extend to the community for it to be successful and useful. As long as any school programme is not benefiting the local communities but remains within the four walls of the classroom, then its efforts come to nought. Education to be useful must transform the lives of the people around the school (Mr L. Dube, Regional Director for Mash. Central Region. Official opening of the 6-10 January 1997 CAMPFIRE Science Exhibition Workshop for Teachers).
Intended Short term outcomes	One of the functions of the facilitator's workshop is to make teachers aware of the problems in their communities so as to look for solutions through the projects that the children carry out (Mupfuni, 1997). Teachers assist pupils identify the root problems in the community and guide them through their collections, investigations and Design, Recipe and Technology (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004). Collections: Pupils gather materials and/or information on

an identified topic(Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004). This leads to the development of increased awareness of their environment by pupils (and teachers) (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004).

Pupils learn to make collections in an environmentally friendly and safe manner (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004).

Collections products such as Seeds may be used for learning purposes, i.e., seeds used as counters in Maths, or planted in the school Nursery. Other collections may be used as teaching aids (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004).

Investigations engage pupils in analysing local situations and problems in the biophysical, social and economic environments and asking questions about the causes

Design, Recipe and Technology involves pupils in identifying problems around a given theme and suggesting several problem solving alternatives; planning and designing the construction or production of tools or substances before choosing the best tool or substance that can solve a problem in a community (Bhunhu, 2001, Mupfuni, 1997)

Through science exhibitions, pupils can identify and solve their local, social, environmental, economic and political problems (Murry, n.d)

Pupils develop skills in Graph drawing and interpretation, English writing and speaking, Written and oral presentations

People in the Science and Research Audit Zone carry out the projects that are entered for the Science Exhibitions, and these pupils, according to the teachers, excel in their other subjects as well (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004).

Teaching processes that include local and indigenous knowledge is also useful ways of contextualising the school in the community. This ensures that the schools are not islands in the community in which they are found but are truly integrated in that community (Director of ACTION, personal communication, September 3, 2004)

Documenting and gathering information can help in the preservation of much indigenous knowledge that is facing extinction (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004).

Learner equipped with skills to help them solve their local problems (Murry, n.d)

The science exhibits and accompanying reports inform the community about what has been learned. A magazine is produced each year by ACTION, reviewing those projects that

	<p>have won at provincial level (Bhunhu, 2001)</p> <p>Exhibition project results can be used as starting points for community income generating projects (Murry, n.d)</p> <p>In this way pupils contribute to community development (Bhunhu, 2001; Murry, n.d)</p> <p>Election of Cluster and District Committees (Murry, n.d)</p> <p>Capacity building as Cluster and District level committees are trained in administration and financial management (Murry, n.d)</p>
Intended Intermediate term outcomes	<p>Local level capacity to sustain the programme is built at the local level</p> <p>Pupil's inventions under Design, Recipe and Technology with commercial value may be patented and taken up commercially at local level or by big companies</p> <p>School benefits financially from pupils' inventions</p> <p>Stimulate community growth through the resuscitation of latent indigenous knowledge.</p> <p>(Data source: Murry, n.d; Headteacher, Mahuwe Primary School, personal communication, September 28, 2004; Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004).</p>
Long term outcomes	

CAMPFIRE Science Exhibitions programme Resources and Prior Functions

In order for these activities to take place Education Officers in charge of coordinating CAMPFIRE activities in new CAMPFIRE districts are sensitized, often through look and learn visits to CAMPFIRE Science Exhibitions taking place in other provinces, to the kind of projects pupils can come up with given the chance to do so. Once the buy-in of these officers has been secured, training for teachers must be held to ensure that each participating school has at least one teacher trained in how to be an effective facilitator and judge of the Science Exhibitions. CAMPFIRE Science Coordination Workshops must be held at District and Provincial level to coordinate and administer preparations for exhibitions at the various levels at which these take place. Districts are supposed to try by all means to fund prizes for all CAMPFIRE Science Exhibitions up to district level. Thus they must hold a fundraising activity of one form or another. If they fail to raise the requisite funds ACTION will approach the Zimbabwe Trust for funding to cover these on a case-by-

case basis. ACTION is the sole funder of all other activities pertaining to the CAMPFIRE Science Exhibitions. ACTION in turn must receive this funding from its donors who include CIDA, USAid and the Zimbabwe Trust.

Linear Logic Model for Mahuwe Primary School Enviro Schools Competition

Aims	<p>To encourage school children to contribute in their small way to a better environment which leads to a better life for all</p> <p>Encourages the active participation of pupils in safe-guarding the environment which is their heritage</p> <p>(Data source: Enviro-Action Schools Competition, 2004 flier).</p>
Objectives	<p>Study and understand nature</p> <p>Acquire a deeper understanding of the interdependent web of life</p> <p>Highlight environmental problems in their community</p> <p>Be part of community environmental problem solving</p> <p>(Data source: Enviro-Action Schools Competition, 2004 flier; Makuwerere, Programme Officer (Schools), Environment Africa, personal communication, August 23, 2004).</p>
Resources/Inputs	<p>Administration</p> <p>Pupil supervision</p> <p>Pupil time</p> <p>Necessary equipment</p> <p>Stationary for report writing</p> <p>(Data source: various programme documents and interviews with staff)</p>
Programme Activities	<p>Annually Environment Africa sits down with the Ministry of Education Curriculum Development Unit (CDU) and agrees on three themes for the competition.</p> <p>Annually Environment Africa then produces competition entry forms.</p> <p>Annually the Ministry of Education produces a circular that accompanies these to the schools.</p> <p>The competition entry form also gives general information about the competition, which include a brief history and aims.</p> <p>Mahuwe Primary School's Science and Research Audit Zone (formed under the school's POEMS programme) identifies an environmental problem in the community related to one of these themes and writes projects that can then be entered for the competition.</p> <p>Teachers guide and supervise pupils in undertaking practical projects that enable them to study and understand nature and acquire a deeper understanding of the interdependent web of life</p> <p>Teachers send the project document to Environment Africa through the CDU.</p> <p>A team of EE practitioners from across the spectrum then marks the projects.</p>

	<p>Prizes are presented to winners at the Annual AGM.</p> <p>The competition runs in both primary and secondary schools</p> <p>Mahuwe Primary School has won the Enviro Schools competition at national level three times. In 1999 the school was number one, in 2000 and 2002 the school was number one. In 2003 the school was number three at national level.</p> <p>(Data sources: Makuwerere, Programme Officer (Schools), Environment Africa, personal communication)</p>
Target Populations	<p>Education Officers, School Heads</p> <p>Primary and secondary School Coordinators and their assistants, school staff, pupils, parents, other members of the community</p>
Problems the programme is facing	<p>MoESC delays in sending out authorising circular that allows schools to participate in the competition. This results in some schools failing to enter the competition due to inadequate time to carry out the projects and write them up for presentation</p> <p>(Data sources: Makuwerere, Programme Officer (Schools), Environment Africa, personal communication)</p>
External factors	<p>MoESC delays in releasing authorising circular that allows schools to participate in the competition.</p> <p>(Data sources: Makuwerere, Programme Officer (Schools), Environment Africa, personal communication)</p>
Values	<p>The competition is based on the premise that each human being is a unique and integral part of the earth's community of life. Accordingly therefore everyone has a special responsibility to care for life and its diverse forms. Everyone should act and live in a way that conserves the natural life and processes of the Earth and respect all species and their habitats. Everyone should work to prevent ecological degradation. This is particularly so given that fact that we did not inherit this planet from the past generation, but borrowed it from the future generation and just like everything that is borrowed it is imperative that we return it in the best possible state (Enviro-Action Schools Competition, 2004 flier).</p>
Intended Short term outcomes	<p>School produces EE projects related to environmental problems in their local community</p> <p>School EE projects bring local EE problems to the attention of Environmental Africa, MoESC through the CDU, the DNR and other organisations involved in the marking/judging of this nationwide competition.</p> <p>Pupils and teachers take part in behaviours that promote an awareness the total environment</p> <p>This promotes a positive change to the community and society as a whole</p> <p>Stakeholders, NGOs, Environment Africa, the District Council, the local leadership and members of the community</p>

	<p>come together to plan how to solve the EE problem that will have been highlighted</p> <p>This competition thus allows the school to contribute in its own special way to a better environment and indeed a better future for all</p> <p>(Data sources: Makuwerere, Programme Officer (Schools), Environment Africa, personal communication; (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004; Headteacher, Mahuwe Primary School, personal communication, September 28, 2004).</p>
Intended Intermediate term outcomes	<p>Community environmental problem solving plan put into motion</p> <p>This results in:</p> <p>Sustainable livelihoods in the form of jobs and resources for community participants</p> <p>Produce from the project sold to the community at a fair price</p> <p>Pupils motivated by the change that their work has brought to the community</p> <p>Stimulate community growth through the resuscitation of latent indigenous knowledge.</p> <p>(Data sources: Makuwerere, Programme Officer (Schools), Environment Africa, personal communication; (Bumhira, TIC EE at Mahuwe Primary School, personal communication, September 28, 2004; Headteacher, Mahuwe Primary School, personal communication, September 28, 2004).</p>
Intended Long term outcomes	<p>Better environment</p> <p>(Enviro-Action Schools Competition, 2004 flier).</p>

Enviro-Action Schools Competition Resources and Prior Functions

In order for this competition to take place Environment Africa must provide manpower to liaise annually with the MoESC as to the themes of the competition. Environment Africa must then meet the cost of producing competition entry forms that contain information about the competition and the themes. The MoESC must produce the authorising circular that will accompany the flier to all schools. The flier and circular must then be circulated to all schools nationwide. This must all be accomplished at a time that leaves schools sufficient time to carry out projects and write the report for submission. Submission is through the MoESC CDU. Environment Africa then puts together a team of judges from Environment Africa, and environmental educators from across the spectrum, i.e., NGOs, the National Herbarium, Mukuvisi Woodlands, the Secondary Teacher Training Environmental Education Programme (ST²EED) and the CDU. Environment Africa must source prizes for the winners. For these they have in the past benefited from sponsorship from a corporate partner. This used to be Natbrew, a national brewing company. Environment Africa and its partners however became concerned about the mixed

messages this partnership sent to learners in schools. They have since withdrawn from this partnership, with the consequent result of Environment Africa having to fund the prizes. The quality of prizes have gone down from expensive packages that included residential bush camps for winning school teams as well as book vouchers for the school, to the more moderate book vouchers and tee shirts for each of the participants of the project. Once a community's environmental problem has been highlighted by the pupils' project Environment Africa's Environmental Rights Unit may step in to educate the community on their environmental rights. Environment Africa and its partners may go and take real measurements and data on the problem, which the community may use to prosecute responsible companies if this happens to be the case. Environment groups such as Environment Africa may also use this data as a lobbying point.

As well as the Enviro-Action Schools Competitions, Environment Africa's schools programme since 1994 has also focused on stimulating environmental education through enviro talks, recycling and anti-litter programmes (RAP). These activities generated a lot of interest among schools in Zimbabwe, as indicated by an increasing number of applications by schools and competition entries. In 2001, Environment Africa started a dialogue with the Ministry of Education, Sport and Culture (MoESC), with a proposal to work with pilot schools to develop school-based environmental policies and management plans, dubbed "POEMS" (Environment Africa, 2003).

POEMS Audit Zone Activities and Outcomes

Audit Zone	Aims	Activities	Outcomes
Nutrition Garden	<p>To develop in pupils a sense of self-reliance through growing nutritious vegetables (To teach pupils survival skills)</p> <p>To instil in pupils a sense of soil and water conservation through proper garden management</p> <p>To inculcate in pupils a sense of financial management through marketing and selling garden produce</p> <p>To generate money through the project to supplement the school</p> <p>(Data source: Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).</p>	<p>Planting of seeds</p> <p>Mulching of beds</p> <p>Watering</p> <p>Compost making</p> <p>Manuaring</p> <p>Weeding</p> <p>Marketing</p> <p>Harvesting</p> <p>Selling</p> <p>Spraying</p> <p>Ridge making</p> <p>Recording</p> <p>(Data source: Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).</p>	<p><i>Short Term</i></p> <p>-To equip pupils with basic skill s of gardening</p> <p>-To supply the school community with vegetables at an affordable price</p> <p>-To teach pupils business principles through marketing and selling produce</p> <p>-As as result some pupils buying from the school and reselling at flea markets in the town</p> <p>-Change of attitude and increased interest in the work involved in the school garden</p> <p>-A gardening project can help learners use scientific knowledge to support responsible decision-making and demonstrate an understanding of the interaction between the natural sciences, technology and socio-economic development.</p> <p>(Data source: Mr Maswera, TIC Nutrition Garden, Mahuwe Primary School, personal communication, 29/9/04)</p>

			<p><i>Intermediate Term</i></p> <p>-School leavers start similar projects at their homes</p> <p>-School garden becomes a community resource, from where people from the community come to buy produce (Data source: Mr Maswera, TIC Nutrition Garden, Mahuwe Primary School, personal communication, 29/9/04)</p>
			<p><i>Long Term</i></p> <p>To enable pupils to be self reliant and have survival skills in life (Data source: Mr Maswera, TIC Nutrition Garden, Mahuwe Primary School, personal communication, 29/9/04)</p>
Nursery (Tree)	<p>To develop an awareness among pupils and local people in that they play a role in conserving natural resources, e.g. trees</p> <p>To enable children to acquire skills in raising and caring for tree nurseries and woodlots</p> <p>To expose pupils to various methods of raising tree seedlings</p> <p>To generate funds through the sale of raised tree</p>	<p>Collecting and selecting seeds</p> <p>Carrying humus (alluvial soil)</p> <p>Sowing seeds</p> <p>Recording</p> <p>Watering</p> <p>Sorting</p> <p>Labelling</p> <p>Cleaning the nursery premises</p> <p>Coppicing</p> <p>Root pruning</p> <p>Thinning</p> <p>Weeding</p> <p>Distributing seedlings to</p>	<p><i>Short Term</i></p> <p>-Raise funds</p> <p>-Establish our own school orchard and woodlots</p> <p>-Develop skills in nursery raising</p> <p>-Children to realise the different possibilities of raising trees from seedlings</p> <p>-Children realise the importance of trees leading to reduced cutting of trees</p> <p>-Children plant trees at their homesteads after</p>

	<p>seedlings To develop an interest in the local people of raising and managing seedlings and woodlots through the outreach programme To embark into indigenous-exotic tree exchange programme with other schools, organisations, etc., who are also in the programme (Data source: Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).</p>	<p>local people Selling the seedlings Transplanting Repairing the beds (Data source: Mr Kamwanza, TIC Nursery, Mahuwe Primary School, personal communication, 29/09/04)</p>	<p>sourcing their own seedlings (from the wild or along foot paths) (Data source: Mr Kamwanza, TIC Nursery, Mahuwe Primary School, personal communication, 29/09/04).</p>
			<p><i>Intermediate Term</i> -Pupils benefit from food bought at subsidised rate from the school orchard -Woodlots established in the local community, e.g., Dyarai Miti Garden, Gurupira Gulley Reclamation project -Parents bring seeds to the school and ask the school to experiment. If the school successfully grow these they give the parents the seedlings (Data source: Mr Kamwanza, TIC Nursery, Mahuwe Primary School, personal communication, 29/09/04).</p>
			<p><i>Long Term</i> -Conservation. We want children to conserve natural resources by/and planting more trees -Gardens sprout up in the community as a result of the school nursery (Data source: Mr</p>

			Kamwanza, TIC Nursery, Mahuwe Primary School, personal communication, 29/09/04).
Orchard	<p>To ensure that there is proper management of resources at the orchard</p> <p>To expand the parameters of the Audit Zone</p> <p>To ensure that produce is properly accounted for by the school pupils involved</p> <p>To train the pupils to manage the orchard on their own</p> <p>To identify the needs of the Audit Zone</p> <p>To enable pupils to gain survival skills through the establishment of fruit trees</p> <p>For competitive purposes, so that we could possibly win prizes such as money and certificates</p> <p>To conserve the environment</p> <p>Provision of food to children and the community</p>	<p>Watering the trees</p> <p>Mulching</p> <p>Weeding</p> <p>Pruning</p> <p>Harvesting</p> <p>Marketing/ Selling the produce</p> <p>Planting trees</p> <p>(Data source: Mr Marota, TIC Orchard, Mahuwe Primary School, personal communication, 30/09/04)</p>	<p><i>Shot Term</i></p> <p>-To establish a viable school orchard</p> <p>-To provide food for children and the community</p> <p>-Pupils display more conservative behaviour, e.g., do not temper with trees in and around the schools</p> <p>-There is decline in destruction of the environment</p> <p>-Success in TGTC Competitions (Data source: Mr Marota, TIC Orchard, Mahuwe Primary School, personal communication, 30/09/04)</p> <p><i>Intermediate Term</i></p> <p>-Viable school orchard that is a Model to the community (Data source: Mr Marota, TIC Orchard, Mahuwe Primary School, personal communication, 30/09/04)</p>

	<p>(Data source: Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).</p>		<p><i>Long Term</i></p> <p>-To enable the pupils to acquire skills they would use after formal education</p> <p>-More programmes like the Dyaraimiti Garden Project in the community (Data source: Mr Marota, TIC Orchard, Mahuwe Primary School, personal communication, 30/09/04)</p>
Plantation	<p>Help learners conserve their environment through the hands-on approach</p> <p>Enable pupils to develop some knowledge of nurturing resources</p> <p>Instil the idea of tree psychology in pupils</p> <p>(Data source: Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).</p>	<p>Constructing a fireguard</p> <p>Pruning the plantation</p> <p>Tree felling</p> <p>Removing unwanted species</p> <p>Labelling and classifying</p> <p>(Data source: Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).</p>	
Health and Sanitation	<p>To conduct participatory Health and Hygiene Education sessions with school pupils</p> <p>To help pupils gain a greater understanding of hygiene risk behaviours and possible interventions</p> <p>To assist children</p>	<p>Toilets (Sanitary): excreta disposal, how to use the toilet, how to use the urinary</p> <p>Diseases (Bilharzias, Malaria, Cholera): identification, means of</p>	

	<p>know diseases, how they spread, prevention and control (<i>Data source:</i> Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).</p>	<p>spread, prevention (<i>Data source:</i> Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).</p>	
Science and Research	<p>To encourage the sustainable use of resources. (<i>Data source:</i> Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).</p>	<p>Investigating</p> <p>Collecting</p> <p>Designing gadgets and recipes</p> <p>Making gadget and substances</p> <p>(<i>Data source:</i> Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).</p>	<p><i>Short Term</i></p> <ul style="list-style-type: none"> -Develop skills to use in day-to-day living -Pupils in this Audit Zone excel in other subjects -Pupils become critical thinkers, who question and evaluate what they see -Win Competitions -Come up with gadgets and recipes that solve local community problems -Understand the root causes of problems that beset the school and the community <p>Pupils move from being observers of local problems to being participants in problem solving (<i>Data source:</i> Mr Moyo, TIC Science and Research, Mahuwe Primary School, personal communication, 29/9/04)</p>

			<p><i>Intermediate Term</i></p> <ul style="list-style-type: none"> - Gadgets and recipes created by pupils widely used in the community <p>(Data source: Mr Moyo, TIC Science and Research, Mahuwe Primary School, personal communication, 29/9/04)</p>
			<p><i>Long Term</i></p> <ul style="list-style-type: none"> -Knowledge -Uncompromised environment. <p>Sustainable use of the environment</p> <ul style="list-style-type: none"> -Change in behaviour and attitude <p>(Data source: (Data source: Mr Moyo, TIC Science and Research, Mahuwe Primary School, personal communication, 29/9/04)</p>
HIV & AIDS awareness	<p>To educate Mahuwe Primary School Children about HIV/ AIDS</p> <p>To educate the school community about HIV/AIDS</p> <p>To promote preparedness to assist HIV/AIDS victims in Mahuwe Community</p> <p>(Data source: Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).</p>	<p> Drama Poetry Speeches Music </p> <p>}</p> <p>=</p> <p>Peer AIDS Education</p> <p>(Data source: Mr Harunavamwe, TIC HIV & AIDS awareness, Mahuwe Primary</p>	<p><i>Short Term</i></p> <ul style="list-style-type: none"> -Produce awareness of HIV/AIDS in every child <p>-Increased knowledge of the facts regarding HIV/AIDS as observed by performance in class tests and exams</p> <p>-Change those behaviours that are changeable</p> <p>-Pollination of information and ideas to pupils and other people that are not in this Zone.</p>

		<p>School, personal communication, 30/09/04)</p>	<p>(Data source: Mr Harunavamwe, TIC HIV & AIDS awareness, Mahuwe Primary School, personal communication, 30/09/04)</p> <p><i>Intermediate Term</i></p> <p>-We expect children as they grow to be more careful in life. They will not be careless, so that they may avoid HIV and AIDS</p> <p>-Decline of numbers of people infected with HIV/AIDS in the medium to long term</p> <p>(Data source: Mr Harunavamwe, TIC HIV & AIDS awareness, Mahuwe Primary School, personal communication, 30/09/04).</p> <p><i>Long Term</i></p> <p>-We expect individuals who are aware of the problems that surround them and are responsible mothers/fathers etc., prepared to assist/support in the community HIV victims or other need y people in the community</p> <p>-Reduced promiscuity in our communities</p> <p>(Data source: Mr Harunavamwe, TIC HIV & AIDS awareness, Mahuwe Primary School, personal</p>
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			communication, 30/09/04).
Resources Utilisation	To instil in pupils the sense of proper utilisation and management of resources at school and in the community (<i>Data source:</i> Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).	Identifying and classifying resources Investigating how resources are used Measuring and recording the findings (<i>Data source:</i> Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).	Auditing and the consequent saving of resources can save your school money for reducing the cost of resources such as water and electricity. The school can also save by reusing and recycling resources. Recycling composting can earn money for the school Managing the school's resources will, for example, enable learners to demonstrate managerial expertise and administrative proficiency (Economics) as well as use skills and display attitudes and values that improve relationships in families, group and community (Social Studies) (Makuwerere, 2004).
Biodiversity No Impact Theory will be drawn for Biodiversity because there is no relationship between the Audit Zone's Aims, Activities and expected short term, intermediate term and long term Outcomes	To develop an appreciation of co-existence of living things within the ecosystem To make children and the community aware of the benefits of biodiversity To highlight current issues on the social aspects, and various challenges the environment is	identifying and naming animal and plant species in their immediate environment Mapping areas of operation Recording the results of observation Drawing graphs Analysing results (<i>Data source:</i> Mahuwe	<i>Short Term</i> -To promote the transfer of information and scientific cooperation in the field of conservation and sustainable use of resources between the community and the appropriate institutions (<i>Data source:</i> Mr Chapoto, Depute Headteacher and TIC Biodiversity, Mahuwe Primary School, personal communication, 01/10/04)

	<p>facing nowadays such as deforestation, overgrazing, and animal control and stream bank cultivation (<i>Data source:</i> Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).</p>	<p>Primary School file on the POEMS Project at Mahuwe Primary School).</p>	<p><i>Intermediate Term</i></p> <p>-To implement income generating projects which are environmentally friendly, i.e., pupils begin fish farming, bee keeping, nutrition gardens etc, in the school and at home (<i>Data source:</i> Mr Chapoto, Depute Headteacher and TIC Biodiversity, Mahuwe Primary School, personal communication, 01/10/04)</p> <p><i>Long Term</i></p> <p>-To promote conservation and sustainable use of natural resources</p> <p>-Change of behaviour and attitude in the pupils and in the community (<i>Data source:</i> Mr Chapoto, Depute Headteacher and TIC Biodiversity, Mahuwe Primary School, personal communication, 01/10/04)</p>
Pollution and Control	<p>To alert people on air, water and land pollutants to effectively control land, water and air pollution to educate the community on activities that are likely to increase pollution and</p>	<p>Identifying pollutants of water, land and air. Suggesting ways of preventing pollution Suggesting ways of educating the</p>	<p><i>Short term</i></p> <p>-Make pupils aware of pollution and pollution control methods</p> <p>-To help clean up their environment</p> <p>-Some Clean-Up Campaigns take up time usually meant for</p>

	encourage it to desist from engaging in them (<i>Data source:</i> Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).	community on pollution Implementing ways of curbing pollution Evaluating the Audit area activities (<i>Data source:</i> Mahuwe Primary School file on the POEMS Project at Mahuwe Primary School).	lessons, thus disturbing normal teaching and learning of academic subjects (<i>Data source:</i> Mr Mukaro, TIC Pollution and Control, Mahuwe Primary School, personal communication, 01/10/04)
			<i>Intermediate Term</i> Develop hygienic habits (Most of the pupils are becoming more responsible, i.e., they are desisting from the practice of throwing litter everywhere) (<i>Data source:</i> Mr Mukaro, TIC Pollution and Control, Mahuwe Primary School, personal communication, 01/10/04)
			<i>Long Term</i> -Develop pollution control skills that pupils can use after formal education -Educate the community on pollution control (<i>Data source:</i> Mr Mukaro, TIC Pollution and Control, Mahuwe Primary School, personal communication, 01/10/04)

PARTIAL Linear Logic Model for POEMS at Mahuwe Primary School

Aims	<p>To assist the school to develop effective and locally relevant school-based environmental policies and management plans, which are integrated into the overall curriculum (Environment Africa, 2003).</p> <p>Such effective EE programmes will stimulate informed community participation in the development of ecologically sustainable ways of living (Makuwerere, 2004).</p> <p>To promote the evolution of schools into community resource centers (Makuwerere, 2004).</p> <p>Provide a framework for curriculum development.</p>
Objectives	<p>Environment Africa's project implementation objectives:</p> <p>To sensitise educators and heads of schools,</p> <p>To equip school coordinators with knowledge and skills needed to implement their policies and action their plans,</p> <p>To impart technical skills to teachers and pupils, to be able to implement projects of their choice,</p> <p>To assist schools to document the process of their cases.</p> <p>(Environment Africa, 2003)</p>
Resources/Inputs	<p>Pollution and Control:</p> <p>Metal bins, rakes, manila for posters, gloves</p> <p>Donors: The school</p> <p>Science and Research:</p> <p>Varies</p> <p>Donors:</p> <p>Biodiversity</p> <p>A number of books</p> <p>Donors: The school Development Committee</p> <p>HIV/AIDS Awareness</p> <p>Library books, posters from the clinic, two teachers, clinic nurse, police coming in to give talks to whole school</p> <p>Donors: The school</p> <p>Orchard</p> <p>Hoes, hosepipe, watering cans, chemicals, fertilizers, stationary</p> <p>Donors: The school, the Lower Guruve Development Association</p> <p>Nursery</p>

	<p>Polythene bags, budding/grafting tools, hand forks, hoes. All tools are brought in by the children from their homes</p> <p>Donors: No one funds these activities specifically. However LGDA sometimes buy some seedlings to support the programme</p> <p>Nutrition Garden Hoes, garden forks, hand forks, piks, spray pump (<i>Data sources:</i> Mr Maswera, TIC Nutrition Garden, Mr Kamwanza, TIC, Nursery, Mr Marota, TIC Orchard, Mr Moyo, TIC Science and Research, Mr Pore, TIC Pollution and Control, Mr Chapoto, TIC Biodiversity, Mr Harunavamwe, TIC HIV/AIDS awareness)</p>
Programme Activities	<p>The initial implementation of POEMS by Environment Africa involved:</p> <p>Sensitization Workshops for Education Officers and School Heads Staff developments of school coordinators and their assistants School-based strategic planning by staff, pupils, parents and other technical organisations. Technical Skills Training workshops for Schools Convergence meetings for Schools in the different regions Final Review Workshop Activities at the school: Appoint a coordinator Convene a working group School audit process Publish draft policy Implement action plans Evaluate and review</p> <p>(<i>Data sources:</i> Makuwerere, 2004)</p>
Target Populations	<p>Education officers and school heads School coordinators and their assistants Teachers and pupils Parents and the community Other technical organisations</p>
Problems the programme is facing	<p>Stray animals destroying the garden Water shortage Teachers consume most of the produce produced in the school The Tree Nursery has no direct market The programme has no direct financial and material support Lack of equipment and stationary Inadequate support from the community (<i>Data sources:</i> School Headteacher, Mr Maswera, TIC Nutrition Garden, Mr Kamwanza, TIC, Nursery, Mr Marota, TIC Orchard, Mr Moyo, TIC Science and Research, Mr Pore, TIC Pollution and Control, Mr Chapoto, TIC Biodiversity, Mr Harunavamwe, TIC HIV/AIDS awareness)</p>

External factors	
Values	<p>Of Mahuwe Primary School Conservation, Communication, Community Service, Utilisation, Sustenance, Preservation (Unpublished school POEMS programme documents)</p>
Intended Short term outcomes	<p>Provide a framework for curriculum development Help organise EE activities Cooperative policy development Wise management of school resources Creation of specific plans for action Development of resources for the community</p> <p>The Development of a School Environmental Policy will result in: Raised environmental awareness among learners, teachers and the community The integration of the environment into teaching/learning situations, planning for better learning opportunities using the local environment and better management of school resources Action projects in the school grounds that provide opportunities for active learning The use of school grounds for hands on activities which can help to realize key concepts in the curriculum In addition these activities can help achieve general curriculum objectives Action projects within the school's Audit Zones will enable school communities to: reduce environmental impacts caused by school activities create an environmental ethic and enable environmental action processes among members of the school community and save money for the school community by reducing costs and generating funds (Makuwerere, 2004).</p>
Intended Intermediate term outcomes	<p>Pupils (now school leavers) use the knowledge from these Primary School Projects to start income generating projects. E.g., Tree Planting, Bee keeping, Fish Farming, etc.</p> <p>Stimulation of community growth through the resuscitation of latent indigenous knowledge.</p> <p>Some of the schools, through their outreach action projects into the community have contributed effective action programmes that stimulate informed community participation in the development of ecologically sustainable ways of living.</p> <p>Some schools have evolved into community resource centres and thus facilitate the exchange of environmental information within the</p>

	<p>community.</p> <p>As per the mission statement of Environment Africa, a number of schools have been working with all sectors of society in raising awareness, encouraging action and advocating a better environment that uplifts the livelihoods of current and future generations.</p> <p>Environmental policy functions at the centre of school life contributing to improved teaching and learning, economic sustainability and the overall quality of life of the community</p>
Intended Long term outcomes	<p>These school leavers with interests in environmental issues can do outreach work in surrounding communities and disseminate environmental education</p> <p>The development of a school environmental policy has contributed to an enriching, healthy and more sustainable environment (Makuwerere, 2004, p.11).</p>

Resources and Prior Functions for the POEMS Programmes

For the programme to carry out the above activities permission must have been obtained from MoESC. The buy-in of District Education Officers (EOs) and Heads of Schools is crucial. Environment Africa has noted that lack of the head's support can derail the project (Environment Africa, 2003). It is not surprising therefore that Environment Africa's first task was to forge a partnership with the MoESC, and then to follow this with sensitization workshops for the District EOs and heads of schools. Teachers and school environmental education coordinators are then trained in the necessary skills to run the project. Back-up extension service is required to meet further training requirements as the need arises. Environment Africa and MoESC provide this. Apart from the Biodiversity Audit Zone which has received some support materials in the form of books on the subject from the International Cooperation Centre in Agronomic Research for Development, and the Nursery Audit Zone which has received some technical support from the Forestry Commission in the distant past, all other audit areas report having no technical support or clerical support. The school administration and the environmental education coordinator supervise the programme in the school. There is however no formal funding structure for the programme. The school is the primary source of funding for the programme,

through the School Development Association. The programme suffers severe shortage of equipment, books and stationary. The Lower Guruve Development Association (LGDA) has supported the initial establishment of the school garden, providing fencing and a borehole and garden tools in 1996. The School Orchard also reports receiving some support from the LGDA.

Table A.1 The POEMS Project Impact Theory: Part 1

Activity	Outcome Spectrum					
	Develop ment of school Audit Zones	Planning for learning opportunities using the local environment	The integration of the environment into teaching/learning situations	Use of the school grounds for hands-on activities (Action Projects)	Opportunities for active learning	School leavers use the knowledge they gained at Primary School to start income generating projects. E.g., tree planting, bee keeping, fish farming
POEMS School audit process						School leavers with interest in environmental issues do outreach work in surrounding communities and disseminate environmental education
					Help understanding of key concepts	Informed community participation in the development of sustainable ways of living
					Help achieve general curriculum objectives, e.g., pupils will grow and manage trees in the school environment (ES Syllabus, Grade 5) (Makuwere, 2004)	The school has evolved into a community resource centre and facilitates the exchange of information within the community: raising awareness, encouraging action, advocating a better environment which uplifts the livelihoods of current and future generations

Table A.2 The POEMS Project Impact Theory: Part 1 conti....

Activity	Outcome Spectrum					
					Reduction of environmental impacts caused by the school	
					An environmental ethic created that enables environmental action processes among members of the school community	An enriching, healthy and more sustainable environment
					Saves money for the school community by reducing costs and generating funds	

Figure A.1 Mahuwe Primary School Orchard Activities – Impact Theory

Continued from p.259.

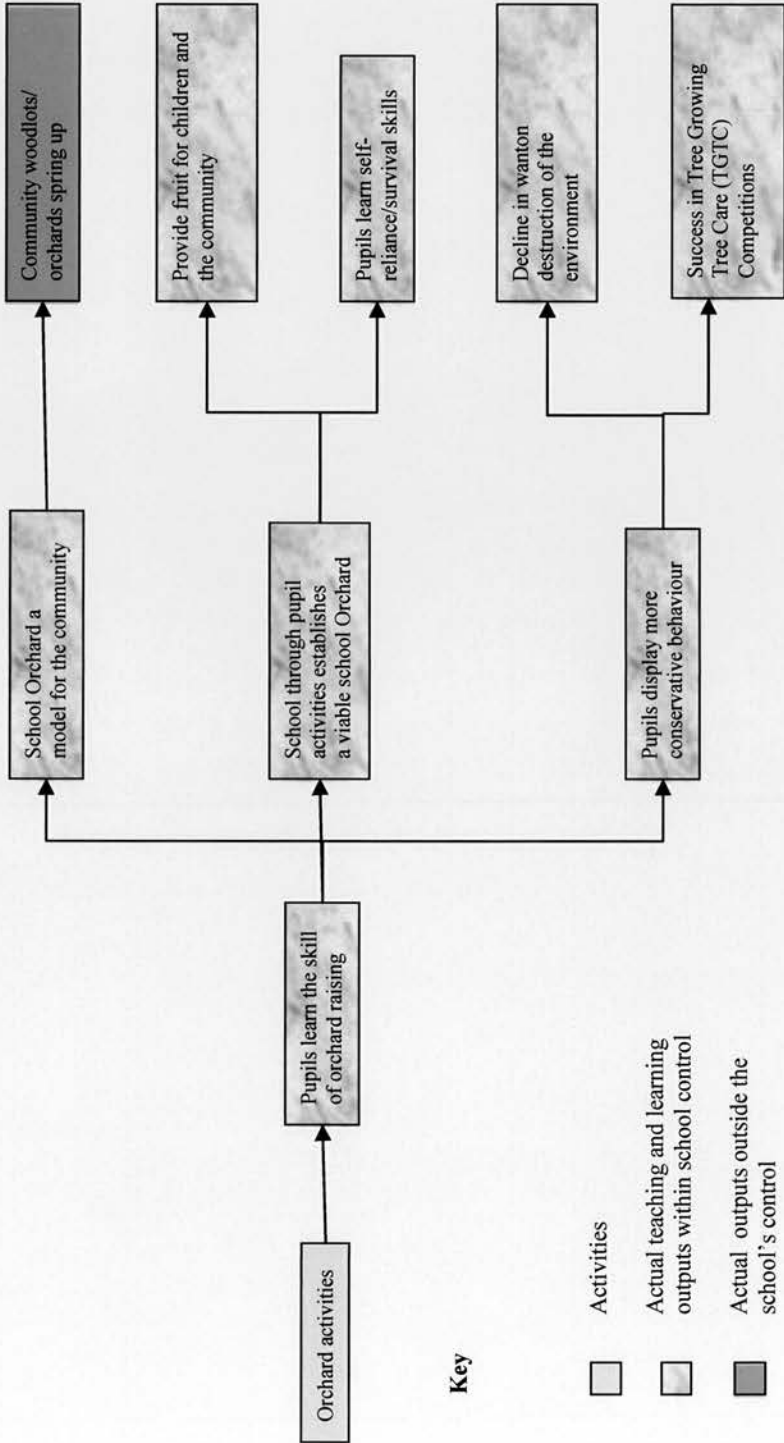
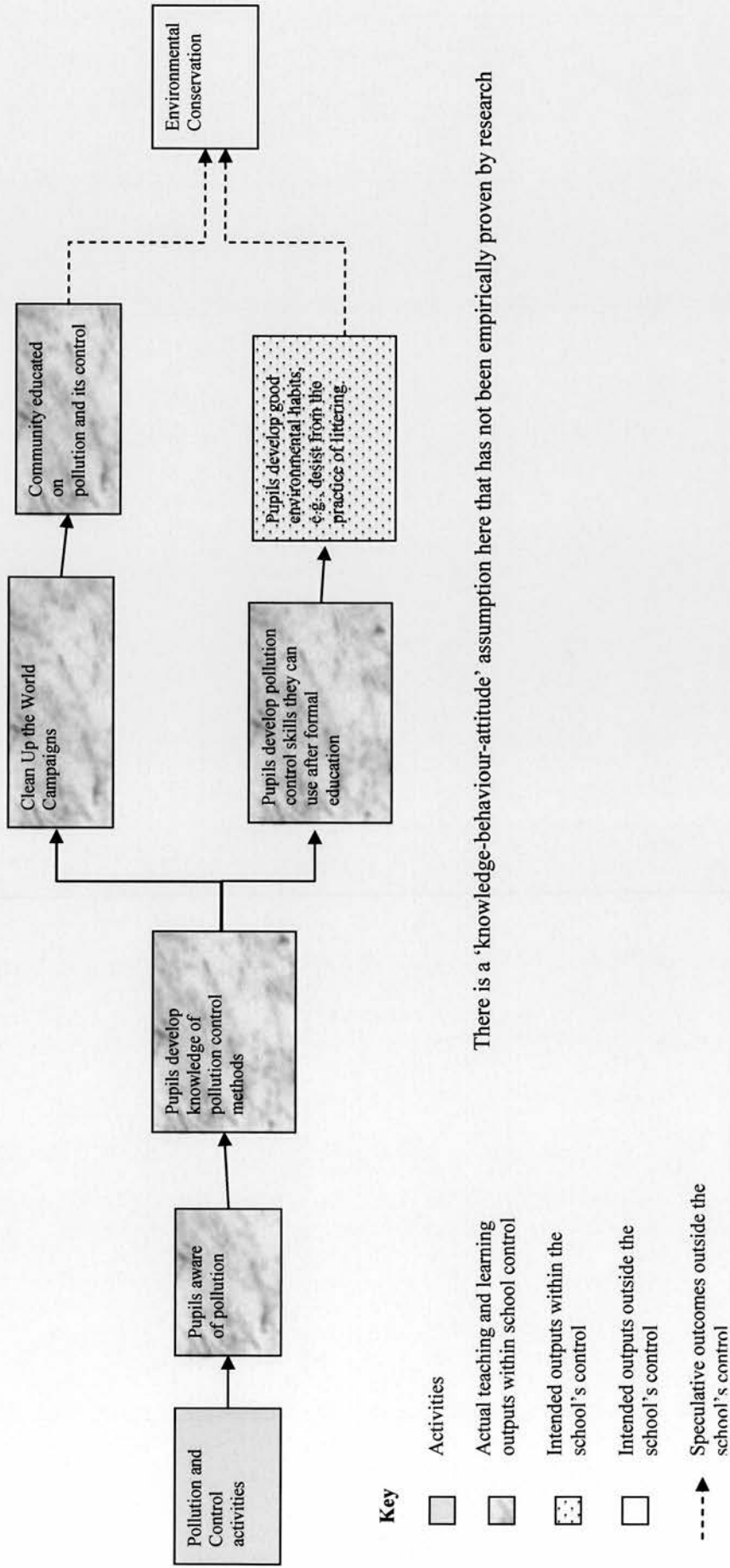


Figure A.2 Mahuwe Primary School Pollution and Control activities – Impact Theory



There is a 'knowledge-behaviour-attitude' assumption here that has not been empirically proven by research

APPENDIX VI

ST MARGARET'S PRIMARY SCHOOL LINEAR LOGIC MODELS

Margarets Primary School SCOPE Linear Logic Model

Aims	<p>To create a nation able to produce enough food to feed itself (TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004).</p> <p>To promote sustainable land use/environmental management (Nyika, 2001b)</p> <p>To equip schools and communities with practical environmental education and solutions (Bote, 2002)</p> <p>To produce pupils with sound environmental education and survival skills (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004)</p>
Objectives	<p>To achieve active involvement of teachers, pupils and parents in the adoption of ILUD</p> <p>To secure adequate funding for school permaculture activities (Muyambi, n.d a)</p> <p>To train all staff members on permaculture principles (Muyambi, n.d a)</p> <p>To divide the school grounds and teacher-pupil population into five working zones (Muyambi, n.d a)</p> <p>To teach pupils Permaculture Principles and Practice (Muyambi, n.d a)</p> <p>To reach out to the surrounding community and schools with training and practical assistance in Permaculture (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004)</p> <p>To showcase the school's success in Permaculture through Permaculture Open Days and Environmental Education School Competitions (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004)</p>
Resources/ Inputs	<p>Water pump, Taps and Ponds (2), garden tools borrowed from pupils' homes, hose pipes (1), sprinklers (2), Wheelbarrow (1), harrows (2),</p>

	<p>shovels (2), watering cans (15), polybags</p> <p>Technical support from SCOPE, AfFOREst and AREX</p> <p>Supportive school administration</p> <p>School policy that requires teachers to integrate permaculture into formal teaching</p> <p>Teacher-in-Charge (TIC) and Vice TIC of Permaculture</p> <p>Teachers who integrate permaculture into formal teaching</p> <p>Zone leaders</p> <p>Funding from Agrifoods, Natural Farming Network, Dairyboard Zimbabwe, Farm and City Centre, Kellogg Foundation, and the local Council.</p> <p>Parents and a community that has bought into the Permaculture programme in the school</p> <p>(<i>Data sources:</i> TIC and Deputy TIC for Permaculture at St Margaret's Primary School, personal communication, September 21-24, 2004, Muyambi, undated a and b, Various class teachers)</p>
Programme Activities*	<p>Practical Rural Appraisal (PRA) methodology used with a group of representatives of staff, students and parents to develop a common understanding of the existing environment.</p> <p>Representatives use the Holistic Resource Management (HRM) model to formulate a broad goal for the school</p> <p>Representatives then produce a design for improving the management and utilization of all the land and other resources at the school.</p> <p>Representatives draw up a simple plan of action to ensure proper implementation of the design</p> <p>Action plans are done on an annual basis and revisited at least every month to check how they are going.</p> <p>Every year the group of representatives develops objectives for land use management and then draws up activities for each objective and assigns responsibilities among group participants for each activity and states when they will carry them out.</p> <p>Trained teachers with the support of the Headteacher train other members of staff and guides Permaculture development in the school</p> <p>Monitoring programme progress</p> <p>Headteacher and teachers apply for funding for more teachers in the school to be trained.</p> <p>Children taught the skills of goat rearing, fishery, chicken rearing and organic gardening</p> <p>School holds Permaculture Workshops that involve parents, members of the community, teachers and pupils (New teachers and pupils initiated into the programme)</p> <p>Teachers and pupils go to assist in the design of homesteads according to permaculture principles in the community</p> <p>Teachers and pupils go to assist other schools develop into Permaculture</p>

	<p>schools</p> <p>School supplies other schools with plant seeds, seedlings and advice on permaculture practices</p> <p>Some trained teachers travel around the country training Universities, Agricultural Colleges, Communities</p> <p>Some teachers pilot permaculture in their homesteads as an example of an out of school application of the programme</p> <p>School holds Permaculture Open Days which may be video taped</p> <p>School takes part Environmental Education School Competitions</p> <p>The following activities take place in the school's zones 1 to 4</p> <p>Evaluation of resources available</p> <p>Examination of constraints</p> <p>Setting Aims and Objectives</p> <p>Selection of the best combination of enterprise</p> <p>Selection of the best combination of crops that are compatible with the school's climate, altitude and soil type</p> <p>Planning</p> <p>Implementation of zone activities</p> <p>Evaluation of results</p> <p>Pupils study (are taught) 'Permaculture' for two hours each week by trained teachers. These hours are part of their Environmental Science time allocation</p> <p>(<i>Data sources:</i> Chari et al., 1995; TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004; Nyika, n.d, Sustainable Agriculture Extension Manual, author unknown, n.d)</p>
<p>Target Populations (Participation)*</p> <p>*Activities and Participation together constitute the OUTPUTS</p>	<p>Grade 3 – 7 pupils</p> <p>Parents</p> <p>Teachers</p> <p>Other members of the community</p>
External Factors	<p>Funding (Nyika, 2001b)</p> <p>Government policy decisions as to the utilization of resources available in the school (TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004)</p> <p>Staff transfers (Nyika, 2001b)</p> <p>The weather (TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p>
Intended Short	Train teachers in Permaculture ethics, principles and practice (Nyika,

Term Outcomes	<p>1998)</p> <p>Develop teachers', motivation and confidence (Nyika, 2001b)</p> <p>Arouse interest in Permaculture (Nyika, 1998)</p> <p>Integrate Permaculture ethics, principles and practice into the various teaching subjects (Nyika, 1998)</p> <p>Use the school grounds as a teaching resource (TIC and Deputy TIC for Permaculture at St Margaret's Primary School, personal communication, September 21-24, 2004)</p> <p>Use the school grounds as an example to pupils and the community of Permaculture in practice (TIC and Deputy TIC for Permaculture at St Margaret's Primary School, personal communication, September 21-24, 2004)</p> <p>Protect and improve soil fertility within the school (Nyika, 2001b, TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p> <p>Use Permaculture water harvesting techniques to improve the availability and efficient utilization of water (TIC and Deputy TIC for Permaculture at St Margaret's Primary School, personal communication, September 21-24, 2004)</p> <p>Use Permaculture principles to control pests (TIC and Deputy TIC for Permaculture at St Margaret's Primary School, personal communication, September 21-24, 2004)</p> <p>Diversified production of seeds, seedlings, vegetables, fruits, herbs and other crops as well as livestock to generate income and food (Nyika, 2001b)</p> <p>Feed the children (TIC and Deputy TIC for Permaculture at St Margaret's Primary School, personal communication, September 21-24, 2004)</p> <p>Pay school fees for some orphans (TIC and Deputy TIC for Permaculture at St Margaret's Primary School, personal communication, September 21-24, 2004)</p> <p>Reinvest income into the Permaculture Programme</p> <p>Use income to assist school administration (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004)</p> <p>Impart practical skills of goat rearing, fishery, chicken rearing and organic gardening to pupils (TIC and Deputy TIC for Permaculture at St Margaret's Primary School, personal communication, September 21-24, 2004)</p> <p>Create an awareness of the full potential of Organic Gardening for sustainability and improved livelihoods</p> <p>Transmission of skills from pupils to adults in the community (TIC and Deputy TIC for Permaculture at St Margaret's Primary School, personal</p>
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	<p>communication, September 21-24, 2004)</p> <p>Hold Permaculture workshops (Muyambi, n.d a, TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p> <p>Hold Permaculture Open Days (Muyambi, n.d a; TIC and Deputy TIC for Permaculture at St Margaret's Primary School, personal communication, September 21-24, 2004)</p> <p>Involve pupils in environmental action both within and without the school</p> <p>Have a school Nutrition Garden for orphans (TIC and Deputy TIC for Permaculture at St Margaret's Primary School, personal communication, September 21-24, 2004)</p> <p>Protect pupils and teachers from transmissible diseases (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004)</p> <p>Beautify the school grounds while productive use is made of them (Sustainable Agriculture Extension Manual, author unknown, n.d; TIC and Deputy TIC for Permaculture at St Margaret's Primary School, personal communication, September 21-24, 2004)</p> <p>Impressive work attracts support towards further school structural development (TIC for Permaculture at St Margaret's Primary School, personal communication, September 22, 2004)</p>
Intended Intermediate Term Outcomes	<p>To create resources for teaching and learning across the curriculum (Nyika, 2001b)</p> <p>To create food forests at school to fight hunger, health problems and create income (TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p> <p>School a showcase of successful Permaculture (TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p> <p>Pupils possess practical skills which they can use to earn a living on leaving school</p> <p>Increased production of healthy and more diverse food for local communities (Nyika, 2001b)</p> <p>A healthier population, able to farm effectively on smaller plots, with minimum labour and resource input to produce balanced, organic nutrition (Nyika, 2001b; TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p> <p>Learners who take pride in their school, and its environment (Nyika, 2001b; Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21, 2004)</p> <p>Permaculture trained teachers reaching out further and further into the</p>

	<p>community training on Permaculture (Nyika, 2001b; Special feature:the success story of St Margaret's Primary School in Permaculture, author unknown, n.d)</p> <p>School becomes a source of plant materials and advice for other schools and the community beginning Permaculture (TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004)</p> <p>Local community homestead examples of Permaculture in practice (Nyapokoto, 2000)</p> <p>Newly resettled farmers minimise cost and conserve the environment through Permaculture (TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004)</p> <p>Increasing number of people establish this philosophy of conservation and health into their homes</p> <p>Improvement in attitudes resulting in recognition of the interconnectedness of people, land, goals and finance (Nyika, 2001b)</p> <p>Environmental action inculcates and reinforces positive environmental attitudes (Nyika, 2001b)</p> <p>Spread Permaculture gospel to surrounding schools (TIC for Permaculture, St Margaret's Primary School, personal communication, September 22, 2004)</p> <p>Create a pleasant (cool, dust free, quiet, private) and safe (protected from adverse effects of natural disasters) environment for the whole school population (TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p> <p>Use generated income to assist school administration (TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p> <p>Sell seedlings to the community at discounted prices (TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p> <p>Reduce land pollution</p> <p>Trained teachers become part of SCOPE Trainers of Trainers team (TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004)</p> <p>Schools become a focal point for the promotion of sustainable land use</p> <p>Well developed school attracts and retains qualified teachers ((TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004) resulting in better quality teaching offered to learners at this school</p>
Intended Long Term Outcomes	<p>Mitigate against the effects of HIV/AIDS (Special feature: the success story of St Margaret's Primary School in Permaculture, author unknown, n.d; TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p> <p>Reduce the burden on health Institutions (TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004)</p>

	<p>The sick, the young, the HIV/ AIDS sufferers, and the old survive better on minimum labour, minimum input farming (TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p> <p>Citizens with knowledge, skills and attitudes relevant to sound/relevant environmental education (Nyika, 2001b)</p> <p>A school and community equipped with practical environmental education and solutions (Bote, 2002)</p> <p>Permaculture becomes a nationwide programme (TIC Permaculture, St Margaret's Primary School, personal communication, September 22, 2004)</p> <p>Permaculture homesteads within the community (Nyapokoto, 2000)</p> <p>Schools become a satellite for different forms of knowledge (TIC for Permaculture, St Margaret's Primary School, personal communication, September 22, 2004)</p> <p>A nation able to feed itself in a sustainable environment</p> <p>Well developed school environment with sufficient water resources adequately reticulated (Nyika, 2001b; TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p> <p>Create a school community that lives in harmony with nature (A harmonious environment?) (TIC and Deputy TIC Permaculture, St Margaret's Primary School, personal communication, September 21-23, 2004)</p>
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The SCOPE Programme's Resources and Prior Functions

As previously mentioned the Schools and Colleges Permaculture (SCOPE) Programme is a unit of the Zimbabwe Institute of Permaculture (ZIP) which works in partnership with the Ministry of Education in the area of environmental education. In addition it works to develop an environmental education curriculum that is centred on building an understanding of, and application of ecological principles on which sound land use practices are based. It does this through continuing attempts to design a Permaculture based environmental education syllabus that will (it is hoped) become a separate subject in the schools. A committee whose members are drawn from the Ministry of Education and the ZIP manages the Programme. A full-time Co-ordinator reports to the committee and implements policy. The Ministry of Education provides support through office accommodation and communication channels as well as personnel as most of the trainers are teachers and lecturers. The ZIP provides personnel, funding and forward planning. It has other supporting units such as the Fambidzanai Training Centre, Natural Farming Network (NFN), Participatory Ecological Land Use Management (PELUM) and Association for Farmers of Organic Research and Training (AfFOResT). All these are available to schools for technical support and advice as the need arises. Technical support is also obtained from Agricultural and Rural Extension Services (AREX), which has extension officers in each district in Zimbabwe.

Phase One of the SCOPE Programme was launched in 1994. As part of the activities of this phase seminars and workshops were held for Regional Directors, Deputy Regional Directors, selected Education Officers and District Education Officers, Heads and selected Teachers from the participating schools. The ILUD process is the main frame of reference for all training workshops that are run by the SCOPE Programme.

The headteacher with the help of some teachers applies to various sources for resources to support Permaculture Programme activities within the school. Support in cash and needed equipment has come from Ministry officials, the local council, SCOPE, Natural Farming Network, and companies such as Dairy Marketing Board, Agrifoods, Farm and City Centre, National Farming Network and The Kellogg Foundation.

The Permaculture Programme has the complete support of the school administration. The programme takes a whole school approach. Thus teachers' training in permaculture both within and out of the school is well supported, with administration and fellow teachers rearranging their timetables to make this possible without compromising the quality of pupil teaching. The school has a teacher-in-Charge (TIC) and vice TIC of Permaculture. The school has a policy that requires teachers to integrate permaculture into their formal teaching. This means that teachers are required to take all suitable opportunities during their teaching to highlight permaculture principles and to use the food forest that has been created within the school as a teaching resource. The need for outdoor activities to supplement classroom activities during teaching is made even more important by the lack of textbooks, magazines and other visual aids within the school.

The school has been divided into five Zones according to how much care and attention is needed in each zone and how regularly visits are needed regarding the different activities.

A teacher who has received basic permaculture training supervises each zone. This Zone Leader works with other teachers and pupils allocated to that zone. Teachers divide themselves into the five zones on the basis of their personal interest. Children were distributed according to grades, and are expected to change zones on a termly basis. It is pupils under the teachers' supervision that do the work within the different zones. Piped water is reticulated to the different zones. This minimises the labour of watering the plants. Some zones boast a pond. The pond is used to keep fish and manured water, which is also used to water the plants.

Teachers supervise the distribution of fruit to pupils when these are harvested. The school sells all excess produce.

The headteacher and some teachers within the school apply for funding to support programme activities. Funding and support has been obtained from Agrifoods, Natural Farming Network, Dairyboard Zimbabwe, Farm and City Centre, Kellogg Foundation, and the local Council.

Parents have gradually bought into the Permaculture Programme. This is evidenced by good attendance by pupils from classes that are assigned to work in the garden and orchard during school holidays. Further, members of the community no longer herd their livestock into the school fields and garden.

A phase whereby Permaculture schools were to train all the other schools in their cluster was scheduled to begin in September 2004. This however never began due to lack of funds.

The figures that follow show the Impact Theory for activities that are taking place in different Zones at St Margaret's Primary School. Only Impact Theories for the school Nutrition Garden and the school Nursery was shown within this main body of the thesis.

Figure A.3 St Margaret's Primary School Permaculture School Garden Activities – Impact Theory

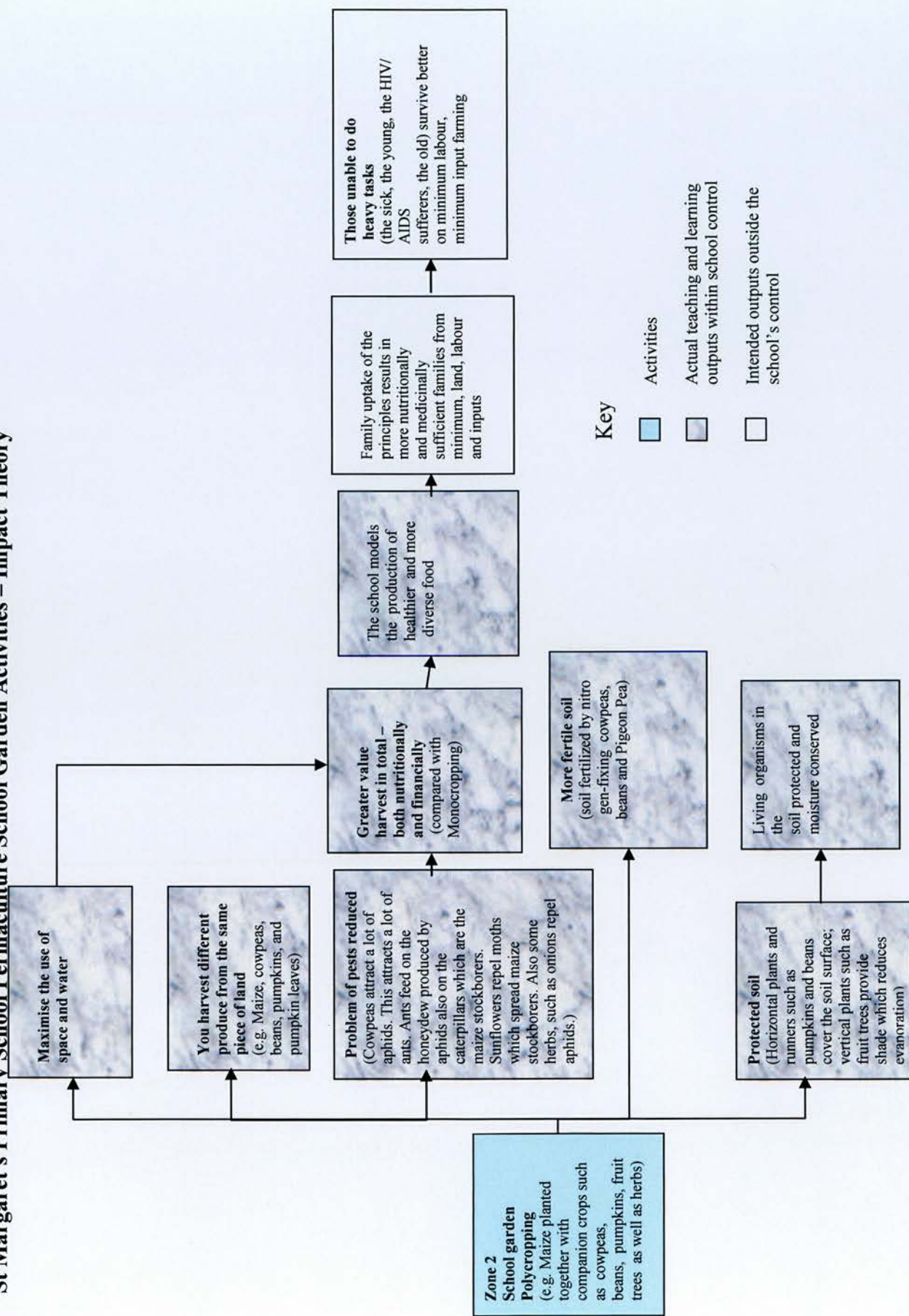
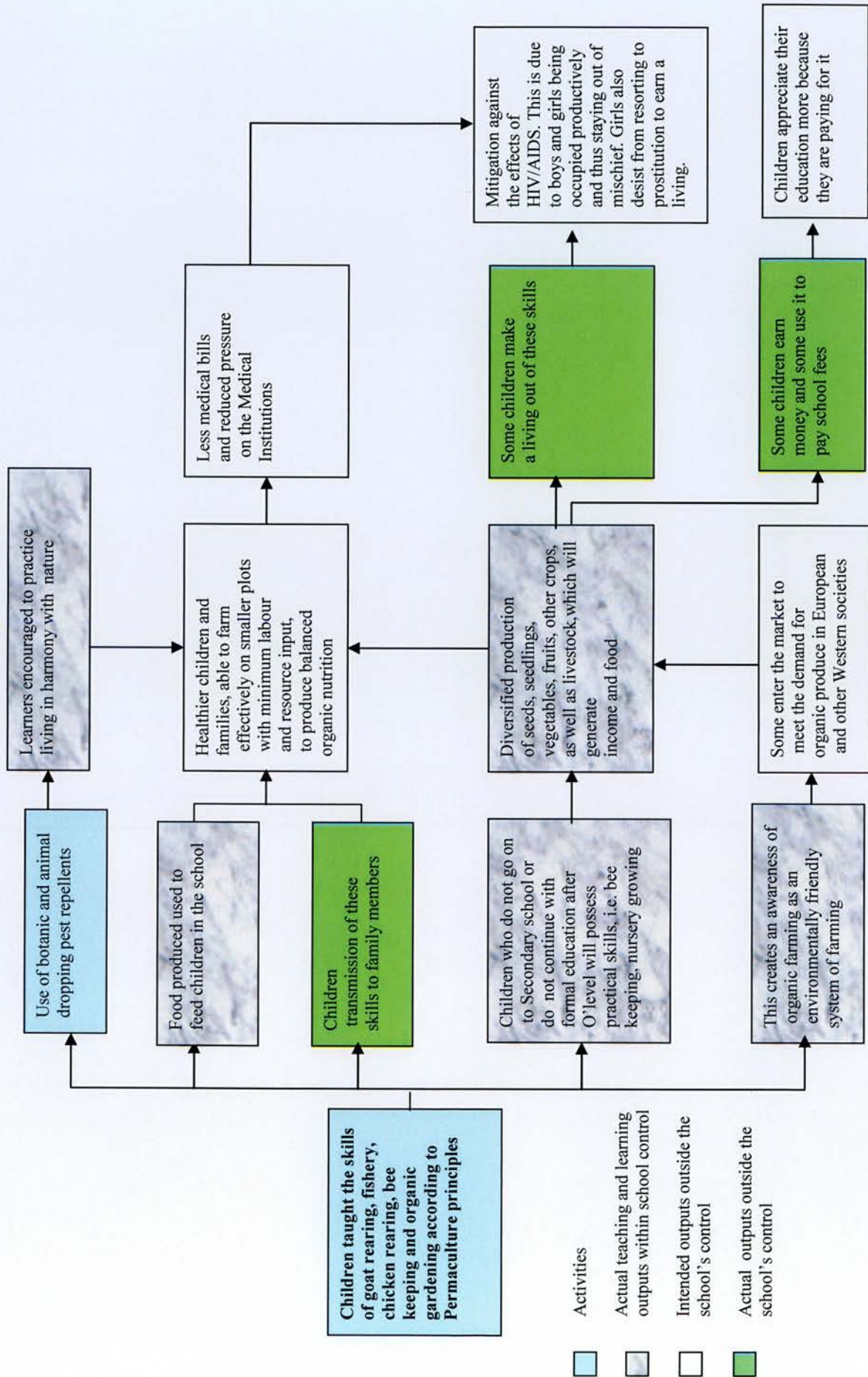


Figure A.2 St Margaret's Primary School Permaculture Skills Development Activities – Impact Theory



APPENDIX VII

COURSE OUTLINE FOR THE S1 ESD COURSE AT CURRIE HIGH

Below is the outline for the S1 ESD Course run by Currie Community High School.

How education for sustainable development is undertaken is as important as what is taught. If we are helping young people to develop the knowledge, skills and values they need to be active and informed citizens, contributing towards a better world, they need opportunities to put these qualities into practice. This means creating a learning environment where there are frequent opportunities to, for example:

- listen to others;
- express and justify points of view;
- make informed choices between alternatives;
- work collaboratively, learning to communicate, negotiate and respect democratic decisions;
- think critically;
- take part responsibly in school and community based activity.

Questions about what kind of a future we want for our planet and what we need to do to bring it about provide a context for learning. Young people are helped to think critically and understand the connections between:

- what they learn in different subjects;
- school learning and the real world;
- environmental, social and economic issues;
- the past, the present and the future;
- the choices they make and the consequences of those choices for the environment and for other people.

Source: Teachers in Development Education, DEC (Birmingham) (from Learning today with tomorrow in mind)

The aims of this course are:

- To lead pupils to an understanding of the concept of sustainability
- To encourage pupils to investigate and integrate information from different subject areas using different types of resource material so fostering the processes of linked thought
- To provide an opportunity for pupils to take practical action towards preservation of the environment for the future

Theme: 'Currie Community High School in 2050'

Year 1

Pupils will research a variety of issues impacting on Currie 50 years ago, the current situation and through informed discussion envision life as they would like to see it in 2050. They will discuss change that will be required and how this could be achieved.

Year 2

In partnership with a school in Africa, pupils will be encouraged to look at the different lifestyle and culture and consider the concept of environmental impact and the effect that the way of life of the 'first world' has on developing countries.

Topics:

- Health
- Food and diet
- Local environment
- Work and leisure
- Transport
- Fashion and the home

Investigation of each topic must focus on some of the following issues:

- Use of natural resources
- Waste management
- Pollution
- Climate Change
- Effect on people and their lifestyle and expectations
- Economic impact
- Respect for others and ethics

There will clearly be overlap between topics and many of the issues will be in common, this is a positive factor emphasising the importance of understanding the inter-dependence of man and the environment, society and the economy, i.e. the basic concept of sustainable development

Format:

The course will run for 18 weeks, one hour per week.

Classes of 30 will be divided into three groups. Each group will work as a team and study two topics out of six offered. The emphasis is on the processes of investigation and the understanding of man's impact on the environment rather than a comprehensive knowledge of any given topic, but there will be a sound body of information for the pupils to assimilate.

The groups will create:

- A selection of web pages on their chosen topics which will be assembled into one web site representing the collective work of all the classes
- A display of written and visual material which will be set up for parents' evenings
- Presentations including use of Power Point

Thus the information on all the topics is shared with the whole class and the wider community

Dissemination to the Community: web site and possible open evening / display at Parents' evenings

Core skills to be addressed include: investigation and working with others, IT etc

Consultancy: project coordinator is working with Peter Edwards to develop course activities and materials to create a generic course which could be adapted for use in other schools. There will be a 'core' content with optional variations which will be appropriate for the staff teaching the course. CPD elements to be built in.

Staffing: core group of three staff: IT teacher, librarian, project co-ordinator working with one of Geography, Science, Art teacher

Curricular time: from the 15% flexible curricular time

Alison Nind 24 June 03

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Curricular time: from the 15% flexible curricular time

Alison Nind 24 June 03

SLIED Course Outline

1. Introduction to course and life in Currie 50 years ago:
 - 'Jigsaw' activity: pieces from 4 photographs taken in the 1950s are distributed to pupils. Pupils form groups as each jigsaw is completed. The groups discuss the images and record impressions and deductions. Whole class brainstorm.
 - Map activity: maps from 1852, 1957 and 2000 without annotations presented. Pupils identify the area and discuss changes in Currie village and environs.
2. Setting the scene, topic choice:
 - Display of artefacts and resource material from 1950s with accompanying worksheets.
 - Pupils assigned to groups, they then choose from 9 research topics
3. What is sustainable development?
 - Concept simply explained using example from marine fish stocks
 - Introduction to use of the LRC and research
 - Working as a group guidelines
- 4 & 5. Research and school grounds interpretation, class split:
 - Preparation for interview of local people
 - Topic research using the internet
 - School grounds interpretation of concepts: change of land use, replacement of lost habitats, biodiversity, sustainable conservation.
6. Interviews:
 - Pupils, in their topic groups, conduct interview of local person using prepared questions, review information obtained and ask additional questions.
 - Topic research
7. Planning activity:
 - Groups write detailed instructions on method of making a jam sandwich and a cup of coffee.
 - Groups rotate and attempt to carry out these instructions, identify errors and omissions.
 - Brainstorm working as a group, allocating tasks, simultaneous tasks etc

development

- Pupils apply planning technique to their topic research and presentation
- 'Compass Rose' tool to explain the concept of the impact on the environment, economy and society and who influences the decisions made, using example from the fishing industry. Pupils to apply to their topic area.

9-11. Construction of web pages:

- Pupils taught how to use the Digital Brain programme and enter research results

12-14. Futures visioning:

- Role play enacting a meeting between a shopper of today with one from the 1950s. Issues include waste, shopping habits, food products, transport, household commodities.
- Re-visit Compass Rose
- Groups research two SD issues related to their topic today
- Pupils envision the future if we continue to live without making change
- Pupils envision their preferred more sustainable future.
- Research entered in web pages

15-16. Preparation and final group presentation of work undertaken.

Groups will present a summary of their work to the rest of the class

17. Evaluation, discussion and identification of aims for a more sustainable future

APPENDIX VIII
PUBLICATIONS

Environmental Education Programme Theory: a case study.

Myra Kandemiri, University of Edinburgh

Introduction

The Tbilisi Declaration in 1978 defined environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action. It also identified the objectives of environmental education as awareness, knowledge, attitudes, skills and participation. Most environmental educators have since universally adopted these objectives (Thomson and Hoffman, 2002). Although environmental education is not a separate subject in the primary school curriculum in Scotland there is a clear provision for environmental education in the Scottish 5-14 National Guidelines.

The Renfrewshire Council Primary 5 Environmental Education Programme (hereafter abbreviated REEP) was initiated by the local education authority, Renfrewshire Council. Its conception was triggered by the closure of the Renfrewshire Outdoor Education Centre, Ardentinny. The primary aim of the programme is to add value to what is done in schools by providing all primary age pupils at P5/4 with an outdoor environmental education experience that is based on practical learning activities

This paper details the explication of programme theory for the REEP. Programme theory is the set of assumptions about the manner in which a programme relates to the social benefits that it is

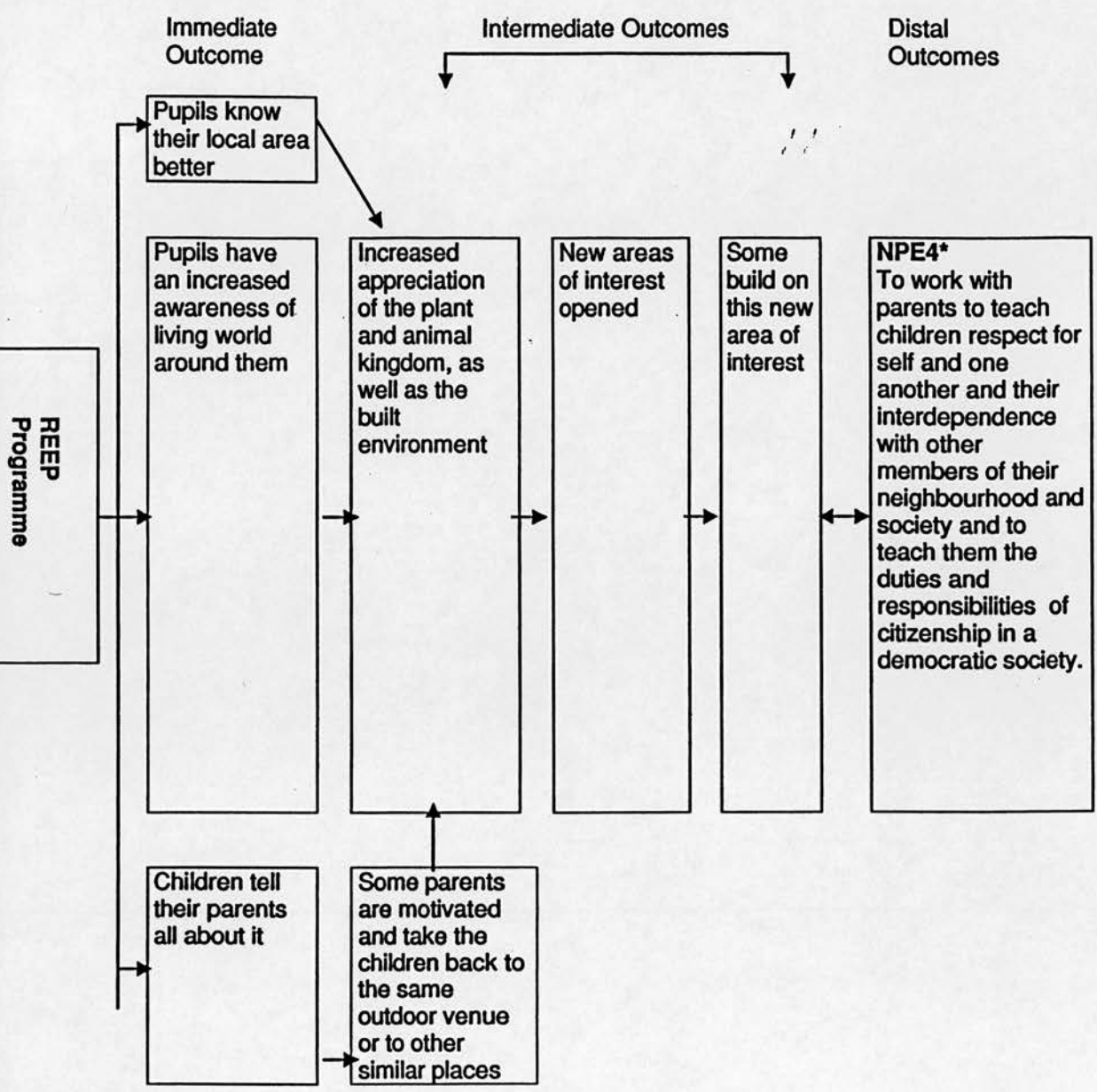
expected to produce and the strategy and tactics the programme has adopted to achieve its goals and objectives. Rossi, Freeman & Lipsey (1999) distinguish within programme theory *impact theory*, relating to the nature of the change in the context brought about by programme action, and *process theory*, which depicts the programme's *organisational plan* and *service utilization plan*.

Methods

Structured one-to-one, tape-recorded interviews with two of the programme's managers, a fieldwork tutor, and the manager of one of the nature reserves involved in the programme. A study of national policy documents, the programme's own policy documents, project plans, publicity brochures, and evaluation feedback from teachers and members of the steering committee. The interviews were transcribed and together with the documents provided information that was used to create a logic model of the programme showing information on *resources, activities, target populations, external factors, outputs* and *outcomes*. From this logic model and with continual further interaction with the data the impact theory and the process theory were described. After programme theory had been developed it was validated iteratively by the development officer and the primary school teacher.

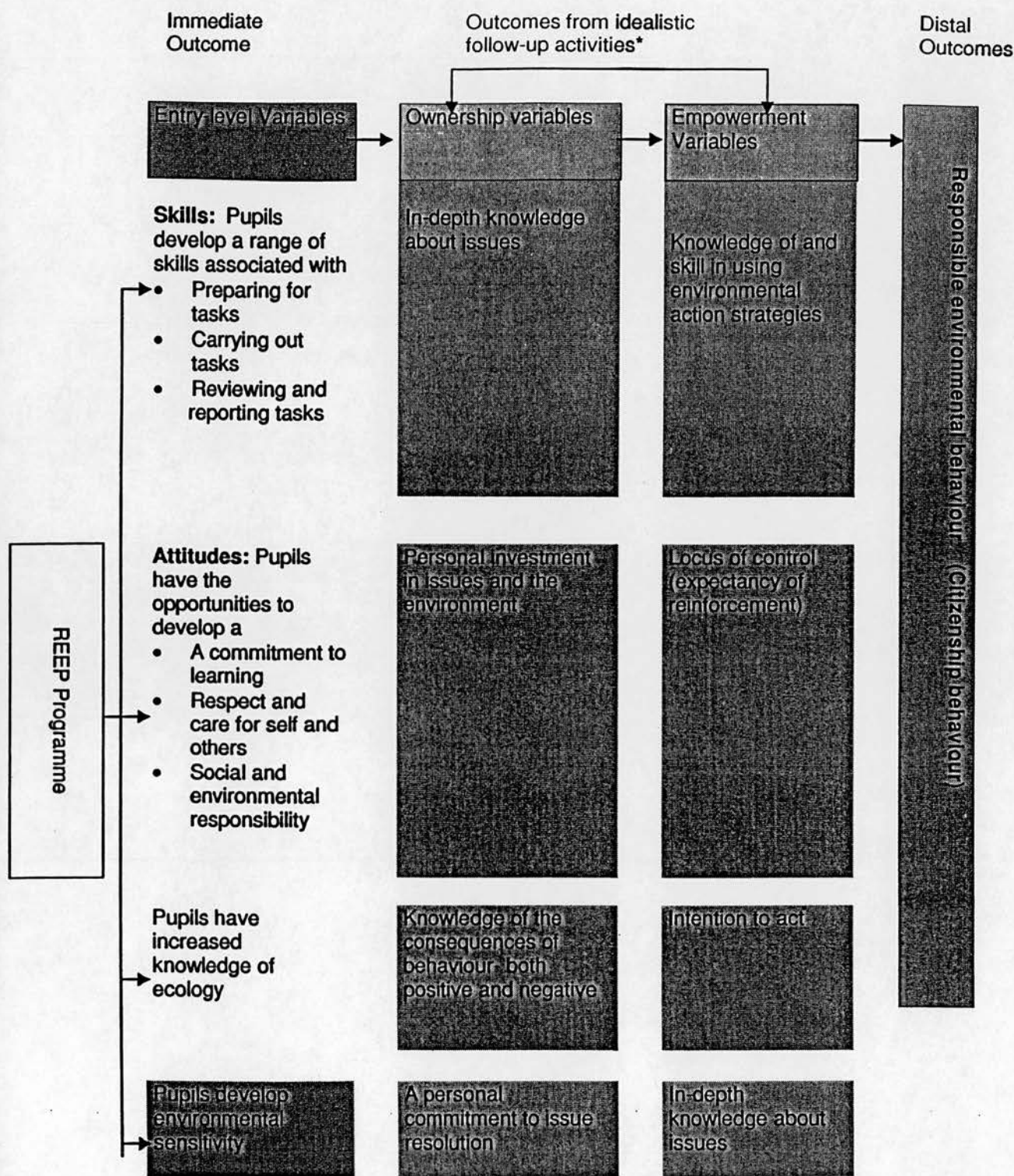
The results detail the REEP's impact theory and its *action hypotheses*. The action hypotheses are the set of assumptions representing the expectation that the programme actions will have the intended effects on the proximal or immediate outcomes.

Figure 1 REEP impact theory



* National Priority 4 from the five National Priorities in Education for Scotland.

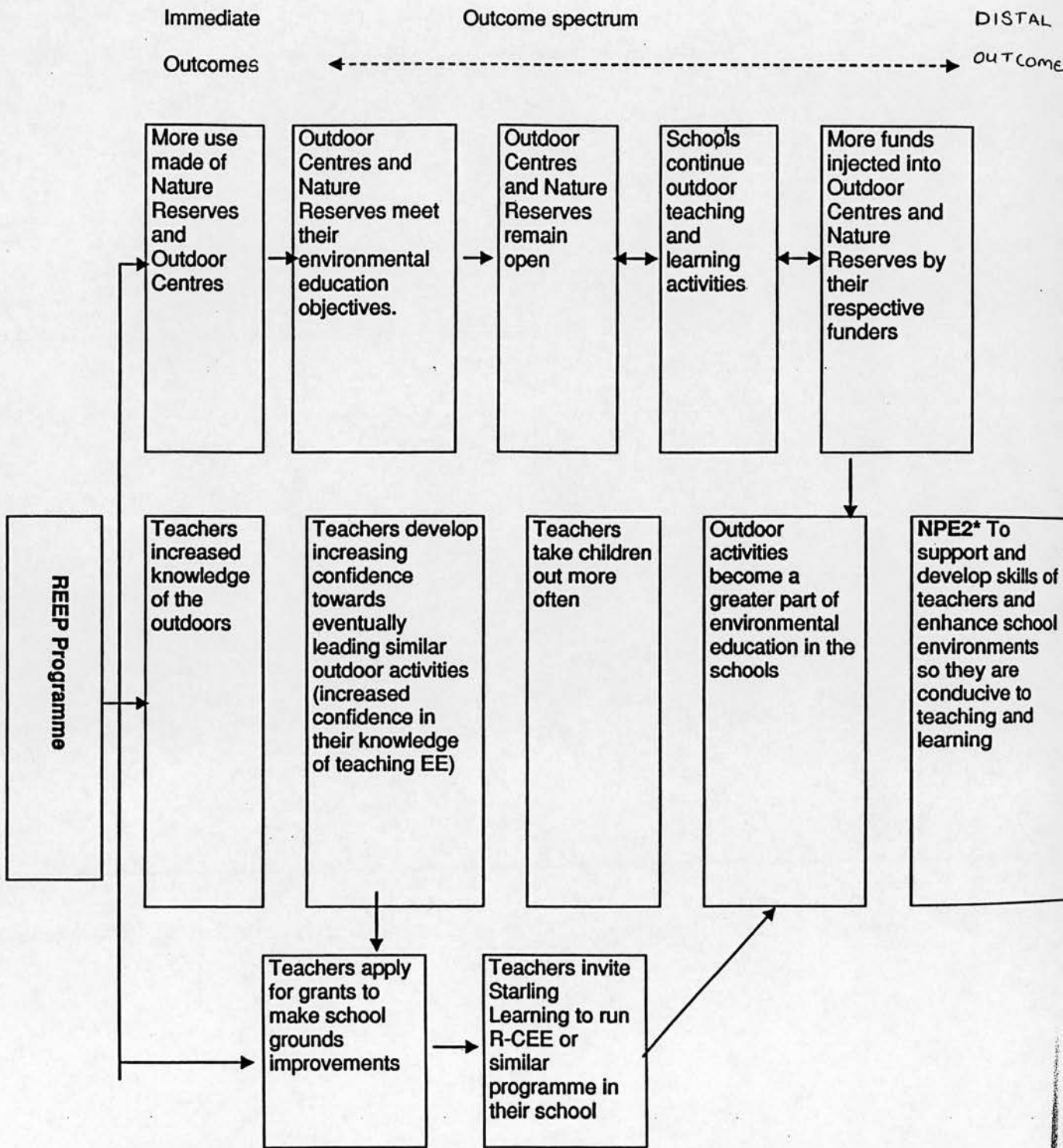
Figure 1 REEP impact theory conti....



Source: The unshaded Entry level variables are confirmed in this research as the proximal/immediate outcomes of the REEP programme. The shaded area of the diagram is adapted from Hungerford and Volk's (1990) Behaviour Flow Chart of variables involved in Environmental Citizenship Behaviour.

*No follow up activities targeting specifically these outcomes had been identified at the time of writing. Eco Schools is in operation in primary schools in Refrewhire Council and their activities may be contributing to Ownership and Empowerment Variables.

Figure 1 REEP impact theory conti....



The Action Hypothesis for the REEP

The following assumptions underpin the programme:

- A lot of pupils spend a large part of their time after school watching videos and involved in other indoor activities. Therefore they have limited experiences of playing, exploring and finding things in the outdoors. Consequently the
- pupils have limited interest, or awareness of the living creatures in the environment around them.
- Many school ground environments are so hostile to invertebrate life that few invertebrates could be found if teachers were to take pupils out into the school grounds. The programme assumes also that children come from home

environments that may be equally hostile to invertebrate life.

- Working in small groups as they do during fieldwork activities will develop pupils' social competency skills
- When pupils see living things in the environment they react to them, relate to them and in some cases cease to be afraid of them. This will open up new avenues of interest to them and some will build on this interest in the future.
- If topics include outdoor exercises pupils get an opportunity to look at the environment and see the impact, both beneficial and detrimental, that people have on the environment.
- Pupils enjoy the experience of being outdoors.
- Experiential learning adds value to classroom activities with respect to pupils' experiences, awareness, knowledge and appreciation of the plant and animal world around them.
- Many teachers have little fieldwork experience and lack specialist knowledge of the environment.
- If teachers take part in this programme they have the opportunity to learn more about plants, animals and the environment.
- Teachers' increased knowledge about the environment will increase their confidence about leading the same or similar fieldwork activities.
- If teachers have confidence in leading outdoor activities then they may take pupils out of doors more as opportunities and resources allow.
- In the future circumstances may enable teachers to play a stronger role in the delivery of these outdoor learning experiences.
- When pupils tell their parents about their outdoor experience, the parents may be motivated to take their children back to the same place or to other similar places.

Uses of programme theory

Programme theory provides a description of the programme as it exists and an understanding of the programme issues that really matter to the parties involved. It highlights to programme managers and sponsors aspects of the programme that need modification. The description of programme theory for the REEP has highlighted to programme

management the lack of systematic evaluation of whether the programme meets its goals and objectives. The programme's impact assessment revealed a need for programme managers to look at the holistic provision of environmental education and education for sustainable development in the schools. This would contextualize the input of the REEP and locate any gaps in overall provision. This in turn would inform further review and development of the programme.

Depicting the theory explicitly often brings to the surface assumptions and expectations inherent in the programme which do not seem very plausible to programme personnel. This may motivate programme personnel and other stakeholders to pursue changes in programme design.

I would like to suggest that programme theory could be used as part of a realistic effectiveness cycle (Pawson and Tilley, 1997). It would provide the propositions on how the mechanisms introduced by a programme into pre-existing contexts can generate outcomes.

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EDUCATION-LINE

Environmental education in Scotland: partnerships in practice

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Background

As a researcher in the field of environmental education in Scotland one is often struck by the following:

Voluntary organisations including small, community based organisations, which may begin with a general community focus eventually seek greater and greater involvement with local schools.

Local authorities actively encourage their schools to collaborate with identified voluntary organisations in delivering desired programmes.

Schools welcome and may actively seek collaboration with voluntary organisations in the delivery of school programmes.

So what are the reasons behind these collaborative relationships? The way that these partnerships pervade environmental activities in all parts of Scotland, as well as the complex web of the flow of funding for such partnerships, point to an underlying national strategy. A study of the policy foundation of environmental education reveals this to be the case. The following is an account of the policy framework upon which these collaborative relationships in practice are founded.

The foundation of environmental education in Scotland's schools

The international framework

Activities in Scotland may be seen against a backdrop of events in the UK and in Europe, all of which in turn are influenced and often guided by key international initiatives signalled by names of places - Stockholm (1972), Belgrade (1975), Tbilisi (1977), Moscow (1987) which defined sustainable development, Rio de Janeiro (1992) the first conference on the world's environmental future to be attended by heads of state and government, and which gave the world Agenda 21 as an action plan for progress, Thessaloniki (1997), and Johannesburg (2002) where governments were called to account on their progress ten years after Rio.

Through its membership of the European Community (EC), the United Nations (UN), the commonwealth, the G7 group of major industrial nations, and many other multilateral organisations with more specific concerns, the UK, necessarily, plays a prominent role in the international framework (HMSO, 1994). The UK has, in fact, been involved in a wide range of international environmental and conservation bodies since before Earth Summit times. It has successfully pressed for a tightening of controls on CFC emissions through the Montreal Protocol on Substances which Deplete the Ozone Layer; enhanced protection for some of the world's most vulnerable species through the Convention on International Trade in Endangered Species (CITES); participated in the intergovernmental negotiations aimed at producing a convention on desertification. The UK is also active in a number of new organisations associated with the Earth Summit process.

Within Europe, environmental policy in the UK is inextricably bound up with EC policy and much of its environmental protection legislation is developed in common with other EC member states. Examples are water and air quality, waste management, wildlife and habitat protection, dangerous substances and environmental impact assessment (EIA). The EC has a role in implementing agreements reached in the wider international fora, such as global agreements on climate change and protecting the ozone layer. Within the Community, member states have responsibility to act when this is the most effective means of achieving Community and international environmental objectives.

Bringing it home - Central Government

The response of the UK to Agenda 21's call to national governments was presented in the publication *Sustainable Development: The UK Strategy* (HMSO, 1994). This document was built directly upon the UK's environmental strategy (*This Common Inheritance*) which was adopted in 1990. The UK also prepared a Climate Change Programme, a Biodiversity Action Plan and a Forestry Programme, all of which were published parallel to *The UK Strategy*. The *UK Strategy* reflects a strong belief that the pursuit of a sustainable economy involves all sectors of the community: central and local government, industry, voluntary bodies and individuals. This belief was reflected in the wide consultation with these bodies in preparing the *UK Strategy*.

Scotland's response to the national call to environmental attention was the former Secretary of State for Scotland, Ian Lang, MP, in 1990 setting up the Working Group on Environmental Education, which resulted in the publication *Learning for Life: a National Strategy for Environmental Education in Scotland*, published in 1993. In June 1995 the Scottish Office published *A Scottish Strategy for Environmental Education*. In this publication the Secretary of State for Scotland commends *Learning for Life* to all seeking a guide to his policy on environmental education, expressing explicitly his intention to adopt it as the basis for a Scottish strategy for environmental education. The publication *Learning for Life* remains the central reference in the planning of environmental education in Scotland today. It recognises that environmental education, as a sustained learning experience, is necessary to support policies for sustainable development and effective conservation of the environment.

Learning for Life has been the foundation on which many sectors have based their own policies for environmental education. Para 4.50 of *Learning for Life* states that the success of the national strategy will depend on the support of bodies with the expertise and resources to invest in it. 'They will be primarily in government, the local authorities, the formal education system, business and industry, organisations representing rural and urban sectors, some of which will be voluntary organisations' (pp. 80). They are not expected to work in isolation, but networking between and within sectors is a key element in the implementation strategy.

Policy statements that guide partnerships in formal education

<http://www.leeds.ac.uk/educol/documents/00003458.htm>

Every school should formulate a policy for EE taking into account the methods and approaches required to promote environmentally responsible attitudes and behaviour.

Schools should set an example of care within their community and become environmentally responsible communities within themselves, for example through carrying out audits and responding by taking appropriate action, and by including the aims of environmental education into their statement of values.

Institutional and curriculum audits for schools should be developed with as much pupil involvement as possible, and supported by appropriate staff development and guidance materials.

Schools should make external visits a priority, and should set a policy objective which ensures first hand experience is an integral and essential component of the curriculum for every pupil or student, progressing from sites close to the school or college to contrasting environments.

Local Authorities, public bodies, commercial and voluntary organisations should promote environmental education through appropriate recreation projects, strengthening of ranger and other services and related activities.

Local Authorities should consider the appointment or designation of an officer to co-ordinate and promote environmental education and training for their staff, and for the community they serve within their field of activity.

Local Authority Education Departments should carry out a review of the specific needs and opportunities for environmental education in their area, including staff development needs, teaching resources and centres, and deployment of support for staff from other departments, in order to develop appropriate policies and advice for schools.

Local Authority staff should draw on the expertise of environmental organisations for materials, curriculum development projects, and the provision of staff development in environmental education to promote environmental competence.

The secretary of state is to ensure that the corporate plans of all government agencies and Non Department Public Bodies (NDPBs) make due provision for environmental education

(Adapted from *A Scottish Strategy for Environmental Education in Scotland* (1995))

Local Authorities

One of the outcomes of the Rio Summit in 1992 has been the appearance in a number of countries, including the UK, of Local Agenda 21. According to UK government pronouncements, Local Agenda 21 is accepted as a key instrument for delivering more sustainable development. The Prime Minister, Tony Blair, in his speech to the UN General Assembly Special Session, gave all local authorities until the year 2000 to have prepared a Local Agenda 21. Local authorities are closely concerned with implementation of local programmes for sustainable development. The reasons for this include the fact that local government is the closest level of government to the community and as many as 14 chapters of Agenda 21 have been identified as relating directly to areas of management where local authorities play a primary policy or service role (Speedie, 1998).

Local governments in general fulfil a long-term environmental stewardship role in matters such as waste management as well as planning and control of development. They are in many cases significant investors in their area. They are big purchasers in terms of goods and services. They are regulators of activity in the local area, have statutory planning powers and have environmental health control. Local authorities have statutory powers relating to education. Almost as important is their employee training function as they are often a major or significant employer in their authority. They have the capacity therefore to exert considerable influence over the behaviour of their employees through training and awareness raising. This responsibility over a wide range of functions which impact the environment is one of local government's key strengths. It enables the development of a strategic approach through its corporate services, in consultation with other organisations.

As sustainable development has become a high priority for government this has led in turn to a higher burden being placed on the education system to support this. Speedie (1998) states that for the education system to succeed where it has failed in the past, it is important to link environmental education to Local Agenda 21. The Regional Environmental Education Forums (REEFs) pointed the way towards a renewed partnership between local government, organisations concerned with environmental education and others *with needs in that area*. They identified potential benefits to local authorities and to environmental education. One of the benefits would be to bring environmental education into the mainstream activity, where in the past it has been marginalised, lacking time, space, resources, depending only on support from interested and committed individuals. As it was unlikely that additional resources would be available, better use had to be made of available resources. Hence the challenge for education for sustainable development was to create partnerships and find the resources to take forward environmental education.

The Government Environmental Agencies

There are a number of government agencies, also called non-departmental public bodies (NDPBs) or statutory bodies which the government supports and which play key roles in the provision of environmental education in Scotland. Examples of government agencies include SportScotland, Keep Scotland Beautiful, the Scottish Tourist Board, Teaching and Learning Scotland (formerly the Scottish Consultative Council on the Curriculum - SCCC), the Scottish Arts Council (SAC), Scottish Natural Heritage (SNH) and the Scottish Environmental Protection Agency (SEPA). In general these government agencies help to provide a bridge between government policy within their particular areas of responsibility and the people affected by it, in a way that is human and personal. They have special advantages for developing holistic, systematic approaches for education, and a unique access to local knowledge, and to data unavailable to educators from anywhere else. I will discuss the work of the SNH in a little more detail to illustrate the role of such government agencies in environmental education.

The SNH was formed in April 1992 by an act of parliament. It was a merger of the Countryside Commission for Scotland (CCS) with the Nature Conservancy Council for Scotland (NCCS). It inherited all the powers and responsibilities of its predecessor organisations. The SNH outlined its envisaged contribution to environmental education in Scotland in the publication *SNH Environmental Education Initiative* (SNH,

<http://www.leeds.ac.uk/educol/documents/00003458.htm>

1995). Their approach followed the lead given in the recommendations of *Learning for Life*. The SNH sees as one of its contribution to environmental education nationally as

Encouraging co-operation and co-ordination among organisations providing education about the natural heritage, and between the natural heritage sector and other sectors (SNH, 1995).

In the early days after its formation the SNH realised that it needed to broaden its educational agenda beyond the narrow confines of natural heritage. It recognised working in partnership as a key guiding principle in its working and essential to achieving its environmental education objectives (Borradaile and Grant, 1998). The greatest resource of the SNH has always been its grants programme. In this way it supports other organisations or partnerships to deliver projects and products that complement its aims. It also supports and uses training as a way to both increase and improve skills as well as promote new activity. The SNH also makes strategic partnerships with other agencies and NGOs on agreed projects and initiatives. An example is its partnership with the RSPB to run the Islay Project (Borradaile and Grant, 1998). The project worked with teachers in primary and secondary schools in Islay, providing them with greater confidence in making use of the outdoors to enrich their teaching, and enable the young people to have a better appreciation of the value of their island's natural heritage. Although they judged this project as a success neither the SNH nor the RSPB would have had the resources to sustain such a project elsewhere, unless they could convince other partners, not least the local authorities, of its value. Thus highlighting the necessity of partnerships both to avoid duplication and to maximise use of limited financial and staff resources.

The SNH grant-aids Ranger Services that are employed by local authorities, charitable trusts and private estates that are under heavy pressure from visitors. These ranger services in Scotland make a significant contribution to the delivery of SNH's functions for conserving, facilitating public enjoyment and fostering understanding of the natural heritage (SNH, 1997).

The Voluntary Organisations

Learning for Life sees voluntary organisations as "a mainstay of environmental education now and in the future," who have "consistently applied pressure for the development of environmental education" and "been a source of enthusiastic and knowledgeable people" (pp. 29).

There are many Scottish voluntary organisations ranging in size from the National Trust for Scotland which in 1998 had 230,000 members, to local groups with a few dozen members. They cover an array of remits and roles. Environmental Education is the concern of two kinds of voluntary organisation - the larger general environmental bodies such as the Scottish Wildlife Trust, the RSPB and WWF, and the smaller specialist organisations with education as a major part of their remit, such as SEEC and the Scottish Field Studies Association. According to Lavery (1998) these organisations, like all voluntary organisations, fall into two main types, the 'Third Force' consists of organisations largely funded by the government, and delivering government aims more efficiently and flexibly than government agencies can. 'First Force' organisations, on the other hand see themselves as agents of change, and seek that change both in government policy and society at large. Few Scottish organisations fall unequivocally in either of these categories. According to Lavery the voluntary sector could not be expected to provide environmental education in the long term to the Scottish population without significant levels of financial input from government; or become more 'Third Force'. He admitted however that many would most likely want to remain, or become 'First Force'. To the present day however, very little support is available to NGOs directly from government. NGO support comes mainly from individuals, private sources, such as companies, charitable organisations or grants, the lottery, and statutory sources e.g. SNH, local enterprise companies.

From being small specialist organisations in the 1970s, controlled by a dedicated membership and delivering specialist services such as securing nature reserves, or directing funds to conservation projects, many voluntary organisations have grown dramatically to have large professional staffs, large memberships and complex services, that include policy and lobbying roles (Lavery, 1998). The term NGO is useful in distinguishing these organisations from private companies, national and local government departments, and NDPBS. The dividing line between NGOs, government bodies and private companies has however become blurred, and hybrid organisations are now common. Thus from the 1990s the roles of government, NDPBs, and NGOs have converged, and, it is not always meaningful to draw a distinction between the different types; aims and roles being considered more important. Since *Learning for Life* NGOs have developed increasing confidence in championing environmental education. This has led to greater NGO involvement in consultation at many levels. For example, NGOs are represented in the Education for Sustainable Development Group (ESDG) and the Biodiversity Publicity, Information and Awareness Group. At international level NGOs have made input at UN Commission on Sustainable Development (CSD) meetings, at the Rio Summit of 1992, and at the UN General Assembly Special Session in 1997.

NGOs have worked in partnership with government agencies (SNH, SCCC) since the seventies, the increase in size and experience of the NGOs now means that these are full partnerships rather than client relationships. Beginning in 1996, for example, the Scottish Environmental Education Policy Forum (SEEPF) met twice a year supported by the SNH, WWF Scotland and RSPB with SEEC providing the secretariat. It met to exchange views on EE policy, identify issues and develop solutions as well as establish areas of co-operation and future work. The 5-14 programme has provoked environmental organisations into gearing up their efforts as significant resource providers. The potential for duplication and subsequent waste resulted in the Scottish Wildlife and Countryside Link (SWCL), SCCC and SNH in 1995 setting up the Common Agenda Workshops. These brought providers together, sharpening thinking about quality and appropriateness (Barr and McAndrew, 1998). Three NGOs were heavily involved in the *Learning for Life* group.

Early in 1995 the SNH and the UK-wide charity, Learning through Landscapes (LTL), agreed to join forces to set up the Grounds for Learning Partnership project. This project was to carry on the work started by the Grounds for Learning Forum whose initial role was simply awareness raising and sharing good practice. The SNH and LTL funded the Grounds for Learning project, with the Grounds for Learning Forum and SEEC providing support in kind. Additional support came in 1996 from Amerada Hess Ltd, and the Bank of Scotland. Originally a three-year project, the partnership proved so successful that it has been developed into an organisation in its own right (Kenny, 1998).

The need to network and the development of structures to allow for this, has been an important feature in the development of environmental education in the UK and in Scotland. This need to work together is unlikely to go away, and increasingly wider networks are continually being formed.

Schools

Ham and Sewing (1987-88) identified barriers to environmental education in schools and categorised them into four broad groups; conceptual barriers, logistical barriers, educational barriers and attitudinal barriers. Conceptual barriers stem from a lack of consensus about the scope and content of environmental education. Logistical barriers stem from a perceived lack of time, funding, resources, suitable class sizes, and so on. Educational barriers stem from teachers' misgivings about their own competence to conduct environmental education programmes. Attitudinal barriers stem from teachers' attitudes about environmental education and science instruction. These barriers were found to be true a decade later (Shuman and Ham, 1997 and Robertson and Krugly-Smolka, 1997) and continue to dog environmental education in schools today. In some of

the more recent publications there has been a tendency to encourage not just knowledge but an action component in environmental education. Robottom (1985) wrote that 'environmental education presents a challenge to existing patterns of schooling. Its enquiry orientation is a challenge to habitual patterns of schooling; its interdisciplinary nature is a threat to conventional disciplinary curricular structure; its emphasis on outdoor education presents problems for existing organisation patterns' (Robertson and Krugly-Smolka, 1997). The result has been, for years, a theory/practice gap in the field of environmental education.

What is in it for everyone?

The Scottish Central Government, through its statutory bodies, local authorities, schools and voluntary organisations comes together in various partnerships around Scotland. These partnerships serve a lot of needs and motivations. Below is a discussion of apparent benefits to the partners involved.

This paper has shown that international agreements and conventions guide the UK government's actions. By being signatories to these the Government has a mandate to ensure that there is environmental education provision in the country. They have developed *The UK Strategy* to guide national policy development. Scotland's response, *A Scottish Strategy for Environmental Education*, is advisory rather than compulsory. The government has not committed any significant amount of money to environmental education, and have made this clear from the onset, recommending, even then, the use of partnerships to maximise the use of available resources. The amount of money the government makes available to SNH and other statutory bodies to work in partnership with local authorities, schools, and voluntary agencies is far less than the amount they would need for a commitment to environmental education for each and every school in Scotland. By encouraging environmental education to be carried out by partnerships the government absolves itself of its responsibility to take a key role in the provision of environmental education.

Local authorities have a mandate to guide schools in curriculum delivery. They are expected to develop policy and ensure quality. Local authorities in turn devolve some of this responsibility to head teachers and the schools. Local authorities are, almost always, strapped for cash. These partnerships provide additional resources, including skilled and knowledgeable manpower. This removes the necessity for local authorities to employ skilled manpower to deliver environmental education; neither does the local authority have to train existing manpower. High staff turn-over, due in part to teachers moving between levels in the primary schools and staff loss as teachers move on to other pastures, makes training of teaching staff very difficult for local authorities. Local authorities are aware also of the benefits in alleviating barriers to environmental education in schools that these partnerships represent. Few teachers have confidence in their own ability to run environmental education fieldwork activities, especially at venues outside the school grounds. Teachers do not have the time, or if time could be created, do not have the motivation to plan such fieldwork activities. Partnerships take most of these responsibilities out of the teachers' plate. Hence partners often do the planning of programme content and identification of what part of the curriculum certain activities should fit. This would leave the teacher only with the responsibility of sending out permission slips, and organising follow up activities. Teachers may even get away with no follow up activities - after all, who is checking? In these partnerships the voluntary organisations, sometimes together with the local authority, source required funding. This subsidises the amount to be contributed by schools and the local authorities. Voluntary organisations also produce teaching materials to back their programmes. Thus teachers do not have to wrestle with what environmental education is, what education for sustainable development is, and how it is to be taught. Teachers often have to worry about class size and manageability during fieldwork activities. Partnerships mean extra, *skilled* hands; the teacher's role then often diminished to maintaining discipline.

Voluntary organisations are very happy to work in these partnerships. First, a lot of them have, as a large part of their mandate, environmental education and conservation. Their membership expects them to fulfil this mandate, through appropriate activities, in order to maintain their funding. The greater the extent of their activities, the greater the funding voluntary organisations command from sponsors. Some voluntary organisations such as the RSPB produce free materials for schools to use. Voluntary organisations have thus taken on what is normally government and local authorities' responsibility to ensure teaching resources are available within the schools. This again reflects the degree of the lack of a real commitment by the government to environmental education. Government has put funding behind its policies on literacy and numeracy ensuring adequate staff and resources in all schools, but the same has not been done for environmental education.

Conclusion

Notwithstanding the fact that they have been used as a cope-out mechanism by the government, partnerships formed in the pursuit of environmental education go a long way in addressing the theory/practice gap that plagues environmental education in schools. Through these partnerships hopefully all stakeholders are brought in line with the real and immediate concerns of teachers and teaching practice. With these practices and concerns in mind stakeholders can sort out the conflicts and ambiguities inherent within environmental education theory and decide what can be realistically accomplished within the context of schools. By working together at curriculum development level and at the policy level, these partnerships develop a common foundation based on mutual understanding and can build into their organisational plans realistic expectations from one another towards the fulfilment of a common purpose.

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